



Government of Bengal

Annual

Administration Report of the

Department of Industries

Bengal

For the Year
1937-38

Superintendent, Government Printing
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1939

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FROM S C MITTER, ESQ , B SC (ENG), LOND , A M I E (IND),
Director of Industries, Bengal,

TO THE SECRETARY TO THE GOVERNMENT OF BENGAL,
DEPARTMENT OF AGRICULTURE AND INDUSTRIES

Calcutta, the 30th June 1938

SIR,

I have the honour to submit herewith the Annual Administration Report of the Department of Industries, Bengal, for the official year 1937-38 (including the Report of the Sericulture Section)

2 The particulars relating to "Miscellaneous Manufactures in each Division" have been excluded from this Report and will be submitted separately in due course

I have the honour to be,

SIR,

Your most obedient servant,

S C MITTER,
Director of Industries, Bengal

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CHAPTER I.

Preliminary and Establishment.

Preliminary.—The year under review was a period for the consolidation of the results of our endeavours of the past and for the preparation of new schemes with a view to making the Department still more useful in the industrial development of the Province. The Department has now been in existence for a little less than two decades and ever since its inception the demand on its services has continually been on the increase. In recent years however this demand has reached a dimension which it is well-nigh impossible for the present staff of the Department to cope with. The increase is largely due to the growing interest which the people have been taking in the industries of the Province or what may be more comprehensively described as the industrial-mindedness of the intelligentsia of the Province. With a view to developing this nascent industrial consciousness into a healthy force for the advancement of industries, the Department formulated and developed during the year under review a number of schemes consistent with its scope and resources. Some of these schemes have been accepted by Government and will be put into operation in the year 1938-39, while others were under consideration when the year closed. When these schemes have been given effect to, it will be possible for the Department to render assistance to the interested public in additional spheres in relation to which its expert advice and services are requisitioned. It should, however, be mentioned that the strength of the staff is hardly adequate in relation to the volume of the work which it has to discharge. While the activities of the Department has continually increased the strength of the staff has remained practically the same until this year in which not more than five additional clerks have been sanctioned and the post of a Personal Assistant has been created. The members of my staff, however, have never grudged to put in as much hard

work as they were required to do and it is certain that without their willing co-operation it would have been impossible for the Department to take as big a step ahead as was done in the year under report.

2 Establishment.—Mr S C Mitter, B SC (ENG), LONDON, A M I E (IND) officiated as Director of Industries, Bengal, up to the 9th May 1937 and was confirmed in the post from the 10th May 1937. He held charge of the Department as the Director of Industries, Bengal, throughout the year. He also held charge of the office of the Industrial Engineer, Bengal, up to the 24th September 1937.

Dr R L Datta, D SC, F R S E, held temporarily the office of the Deputy Director of Industries, Bengal, up to the 24th September 1937, and reverted to the post of the Industrial Chemist, Bengal and held it for the remaining portion of the year excepting the period from the 2nd February to the 31st March 1938 when he was on leave.

Dr Ali Karim, B SC (CAL), Ph D (LOND), D I C, A I C, A M I Chem E, was appointed to the combined post of the Deputy Director of Industries and Industrial Engineer, Bengal, on the 25th September 1937, and held both the offices till the end of the year.

Mr A N Sen, M A (CAL & DAC), B SC (GLAS), M I E (IND), held the office of the Inspector of Technical and Industrial Institutions, Bengal throughout the year.

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charge of the office during the remaining portion of the year. He, however, continued to perform the duties of the Industrial Officer.

Mr Surendra Nath Chakravarty held the post of the Superintendent of Textile Demonstrations, Bengal throughout the year excepting the periods, viz, from 2nd to 12th June 1937, 21st to 23rd October 1937 and 3rd January to 31st March 1938 when he was on leave. Babu Sudhir Kumar Banerjee, Senior Lecturer in Technology, Government Weaving Institute Serampore was appointed to act as Superintendent of Textile Demonstrations, Bengal with effect from the 4th January 1938 and held the office up till 31st March 1938, *vice* Mr Surendra Nath Chakravarty on leave.

The following officers held respective charge of the technical and industrial institutions, during the year under review —

Rai B M Das Bahadur M SC (LEEDS) Superintendent, Bengal Tanning Institute, Calcutta, held charge of the Institute.

Mr B C Bhattacharya, M SC (TECH) (MANCHESTER), Principal Government Weaving Institute Serampore held charge of the Institute throughout the year excepting the period from the 1st to 14th April 1937, when he was on leave and Mr P Pal M SC (CAL) and M SC (TECH) (MANCHESTER) Dyeing Lecturer, officiated as Principal during this period.

Babu Pyari Mohan Chaudhuri Principal Bengal Survey School Comilla held charge of the school throughout the year excepting the period from the 21st October to 6th November 1937 when he was on leave and Mr Anandamo, Mookerji M SC B L A P S M B Sc (ENG) LONDON First Lecturer officiated as Principal during this period.

Babu Surendrabandhu Deb Gupta Superintendent E B Technical School Pabra held charge of the school throughout the year excepting the period from 10th to 17th May 1937 when he was on leave.

Babu Sudrangsu Bhushan Bhatta Superintendent Government Technical School Barisal held charge of the school throughout the year.

Babu Sankar Chandra Guha Superintendent B G Technical School Barisal held charge of the

school throughout the year, excepting the period from the 21st to 23rd October 1937 when he was on leave.

Babu Haraprosad Roy Superintendent, Edward Industrial School Bogra held charge of the school up to the 23rd September 1937 when he proceeded on leave preparatory to retirement with effect from the 5th December 1937. Babu Nagendra Nath Das Gupta Assistant Superintendent, was appointed temporarily to act as Superintendent of the School *vice* Babu Haraprosad Roy on leave with effect from the 24th September 1937 and held charge up to the 9th March 1938. Mr Abdul Hamid was appointed Superintendent with effect from the 10th March 1938 and held the charge of the school for the remaining portion of the year.

Babu Charu Chandra Bose Head Master Government Silk Weaving and Dyeing Institute, Berhampore held charge of the institute throughout the year excepting the periods, viz from 3rd to 15th May 1937 and from 18th November to 28th December 1937 when he was on leave and Babu Bhupendra Narayan Dey Assistant Master, officiated as Head Master during the last period of his leave.

Sericulture Section

Mr C C Ghosh, B A, F R E S held charge of the office of the Deputy Director of Sericulture, Bengal throughout the year.

Rai Sahib Surendra Nath Bose held charge of the office of the First Superintendent of Sericulture Malda, throughout the year excepting the period from the 5th to the 8th October 1937 when he was on leave.

Miss M L Cleghorn held the office of the Second Superintendent of Sericulture Tollyganj Calcutta, throughout the year.

CHAPTER II.

Development of Industries

3. Observations — The success of the endeavours made by this department for the industrial progress of the Province cannot be judged without a proper

examination of the concomitant circumstances. It is, therefore, necessary to hold whatever we have been able to achieve against the perspective of our problems and difficulties, so that the value and usefulness of our efforts may be properly assessed.

The foremost of our difficulties is the lack of balance between the factors of production and distribution and the absence of a poise between agriculture and industry. I need hardly repeat the oft-quoted saying that agriculture is the hand-maid of industry or *vice versa* and there is no escaping the truth that it is idle to look for any economic progress without co-ordinated development of these two agencies of production of wealth. Without offending the principles of comparative advantage, it is of paramount importance that the raw materials for some of our essential industries should be grown within the country, so that the basis of our industrial structure may be strong and sound and with the progress of industries agriculture may also prosper. At the present moment these conditions do not obtain and their absence not only imposes a formidable handicap on our endeavours to develop existing industries and introduce new ones but is also, to a great extent, responsible for the disappearance of a number of industries of long standing.

The second difficulty is in regard to matters over which we in the provinces have no control. I refer to the currency and the fiscal policies and to the freight rates. Whatever advantages an industry may possess in respect of market, finance and labour, these advantages can only be consolidated by favourable fiscal and currency policies of the Government and an equitable freight rate. The provincial governments have no hand in shaping the currency and the fiscal policies or in determining the freight rates. It is not suggested that the present fiscal, freight and currency policies of the Central Government militate against industrial development but what is sought to be impressed is that industries organised on a small scale would have been benefited in a larger degree and enabled to withstand outside competition if it were possible for the Provincial Government to render timely relief and assistance where the same are needed. For, any assistance, if it is to be of real advantage

to an industry, must be timed to the requirement of the situation.

As illustrative of the deleterious effect of policies and measures in the formulation or modification of which the provinces have no hand mention may be made of the present plight of the mustard oil milling and the safety match making industries. In the former industry the raw material comes almost entirely from outside the Province and an adverse freight rate on the seed has enabled oil manufactured elsewhere to enjoy an advantage over the oil manufactured in Bengal and wage a ruinous rate war in this province with the result that the Bengal mills and *ghanies* are being compelled to sell their output at uneconomic price or, being unable to do so, to close down. In match industry, the small match works have been mortally hit by the excise duty which has increased the cost of production to, roughly, 300 per cent. Since imposition of the duty, a match factory has either to treble its working capital for the same output or to reduce its output to a third of what it was in pre-duty days. Unable to work under such conditions the small match works have all disappeared, and as regards semi-large factories some of them also have closed down and others are about to follow suit. These limitations of the Department in the matter of helping existing industries to live and grow and bringing about a speedy and all round industrial development should not be lost sight of and when viewed against this back-ground it cannot but be conceded that the work of the Department during the year under report as described in the subsequent chapters, has been useful and encouraging.

Thirdly, there is the problem of finance and marketing. It requires no emphasis that without facilities for finance on easy conditions, smaller industrialists cannot hope to succeed, however well organised they may be in regard to their production. Schemes have been submitted to Government for building up an efficient machinery for finance and marketing and it is hoped that something will be done in this direction in the coming year.

4 **Handloom weaving**—As a means of providing a subsidiary occupation for the vast bulk of agriculturists as also of creating opportunities for the employment of the non-agricultural population

of the Province having elementary education the handloom weaving industry must play, as it has done in the past a very prominent part. To foster this industry the facilities that exist in the Department are provided through the medium of 9 District Weaving Schools, 26 Peripatetic Weaving Schools, 16 Demonstration Parties and 30 Aided Weaving Schools. While these institutions have been doing quite useful work as far as their resources have permitted much yet remains to be done. The following extracts from the Report recently published by the Weaving Sub-Committee appointed by the Bengal Board of Economic Enquiry, bear a pleasing testimony to the useful activities of the Department for the improvement of handloom weaving in Bengal —

policy would cause improved parts and appliances being easily and cheaply available in all parts of the Province

* * * *

It was felt that the introduction of a commercial and practical outlook in our weaving educational system was necessary and with this end in view steps were taken to issue appropriate instructions to the institution either under the direct control of the Department or in receipt of patronage in the shape of grant-in-aid

Cotton weaving has naturally attracted considerable attention but the claims of other sections of the textile industry have also received due recognition

A model jute weaving school was proposed and has since been sanctioned and will be opened very soon. The school when established will be able to—

- (a) turn out trained and skilled labour for employment in small jute weaving factories, and
- (b) show the people of the surrounding area the various uses to which jute can be put through the process of weaving

An employment survey, of cotton textile mills was taken up to find out the normal requirements of the mills in technically qualified staff and skilled labour. The survey was in progress at the end of the year and the information so far collected will be found in a condensed form in Appendix I

With a view to creating facilities for the training of that type of skilled labour which is in demand in the cotton weaving mills, the Serampore Weaving Institute is being modernised in its equipment and fittings and before long will be able to remove a pressing want. In the year under report the laboratory equipments were purchased and fitted up. The training to be provided will not only ensure the supply of skilled operatives but will also be such as will enable the youths trained to set up small power weaving factories not in competition but in active collaboration with the cotton mills of the Province

* * * *

Other services of the Department — Important as it may seem the work above described represents only a small part of the contribution of the Department towards the development of the weaving industry in the Province. The "drive" which the brisk activities of the Department brought into the industry, the new hope, the knowledge of better methods and appliances as also the introduction of new varieties of fabrics (which widened the field for the industry) are amongst the more important contributions of the Department towards the improvement of the industry and the value of these can hardly be described by numbers. The effect that we find in some regions is remarkable. In Kinchin Union (Dacca district) the use of improved looms has caused the average productive capacity to increase by 200 per cent at least and possibly more. Weavers are now turning out new varieties of fabrics new designs and improved dyeing processes are now well known. The peripatetic schools in particular have led the rural weavers to some degree in touch with modern tastes and needs. The "group system" of work, which has been found more extensively in Pabna (not under report) and a variation of which I am advocating, has been a more or less direct result of the training in weaving organisation projected by the Department. Numerous factors the financial handicap being the most important, have restricted the operation of the Department otherwise the improvement would have been more marked.

5 **Industrial intelligence.**—Decentralisation of industries is held to be one of

the cures of unemployment, but decentralisation is possible only when accurate and dependable statistical information is available regarding the suitability of any locality for the establishment of new industries. Accurate statistics in respect of interprovincial trade as well as the export trade of Bengal and India as a whole are available but what is lacking is trade statistics in respect of individual districts of Bengal. Unless it is possible to ascertain readily the volume and variety of manufactured goods imported into any unit area, say a district, or of raw materials exported therefrom, it is impossible to prepare any programme of development of industries which is not exotic, but grows out of the needs and requirements of the people and the locality. The preparation of the programme is rendered the more complicated by the distribution of the majority of the population over vast rural areas, for it is well known that any programme of industrialisation must be broad-based on one fundamental consideration viz, the utilisation of the available man power and raw materials of the particular area. The majority of the population of Bengal being rural and dependant on agriculture, it is the problem of creating opportunities for the employment of this class that has to be coped with. The establishment of large industrial organisations in big cities, etc cannot, meet the exigencies of the situation. The absence of district industrial intelligence, therefore, acts as a severe handicap to the formulation of any plan or programme for the development of small industries. Government have approved a proposal and provided funds for the establishment of an Industrial and Commercial Intelligence Section to be attached to the Department of Industries and a beginning is expected to be made very soon in getting the section going.

6 Silk industry.—The three branches or rather stages of the silk industry are—

- (1) Production of cocoons by ordinary cultivators who grow mulberry, rear the worms at home and sell the cocoons as soon as formed. This is purely a cottage industry.
- (2) Reeling of raw silk from cocoons by reeling concerns who purchase cocoons from the rearers, get raw silk reeled by skilled

workmen (reelers) on reeling machines or devices and sell the reeled silk. This branch is more of a capitalistic than a cottage industry.

- (3) Weaving of fabrics from raw silk carried on both as a cottage and a capitalistic industry.

In the year under report a good deal of progress was made in perfecting the organisations for improving the first two stages of the industry and the appropriate chapter in this report will throw light on what has been done up till now.

7 Industrial and technical education.—The efficiency of production results from the efficiency of the workers. The Bengal craft worker is proverbially conservative. Any improvement whether by way of labour saving devices or the processes of manufacture when sought to be introduced is looked upon with suspicion. If conservatism and suspicion have to be removed, an intensive programme of industrial education has to be taken in hand. Financial stringency stood in the past in the way of the adoption of a bold and comprehensive programme. In the year under review the grant-in-aid fund was augmented by the provision of an additional sum of Rs 19,000 while it was decided to provide an additional sum of Rs 10,000 in the year 1938-39. With this additional provision it will no doubt be possible to take some forward steps, but, in order to meet the needs of the situation the grant-in-aid fund will not only have to be largely augmented but also the Government model training institutes modernised and reorganised according to local needs. In a pre-eminently agricultural country like ours the task of making the people industrially minded bristles with obstacles of a formidable character, and if the objective is to be reached, a simultaneous attack on all fronts must be launched, e.g., on research, training, financing, marketing, organisation, etc. The appropriate chapters deal with the activities of the Department in these respects.

8 Leather industry.—In the leather industry the year under report was one of record activity so far as the manufacture and export of box sides was concerned. Towards the end of the year, however, the chrome tanning industry found itself in the grip of the world wide

slump Every industry has its periodic booms and slumps, and the present slump in the leather industry need not be regarded as an extraordinary event. A slump is not, however, an unmitigated evil. Industry has seen more improvements effected during periods of slump than in spells of prosperity, and a slump often acts as an incentive rather than as a discouragement, by calling forth the best energies of all those who have cast in their lot with the industry.

There have so far been no chemical specifications for sole leathers of Indian tannage and the absence of such specifications has been keenly felt by the trade. Certain tentative specifications based on the actual examination of representative samples have been proposed by the Superintendent Bengal Tanning Institute and will be found in the appropriate chapter.

9 Industrial research and museum.—Industrial research problems tackled in the Department's own Industrial Research Laboratory were necessarily limited by the facilities available but within the limits so imposed the Laboratory carried on valuable research having important bearing on various industries. Varnish ink and soap manufacture, standardisation of glazes for the ceramic industries, certain casting and plating experiments in connection with the non-ferrous alloy and allied industries are but a few of the large number of items of research undertaken in the year under report and a perusal of subsequent chapters will show what actually has been done in the respective sections and the interesting results obtained. With the basic equipments purchased and installed after careful scrutiny the capacity of the Laboratory to take up diverse industrial research problems has been gradually extended but full utilisation of its capabilities will only be possible when the size of the staff is enlarged and the grants under contingencies adequately increased. Various proposals of industrial development now under consideration of Government will when sanctioned afford scope for increased activity in the Laboratory.

Towards the end of the year under report steps were being taken to initiate an investigation into the handmade paper industry, one of Bengal's important flourishing industries now reduced

to a name. It appears that on proper reorganisation following research paper making holds prospect of re-developing into a rural industry of considerable magnitude.

An industrial and commercial museum is an adjunct to any scheme of industrial development. A display of the country's wealth in raw materials suitable for conversion into manufactures, the range of products being types of manufactures from different raw materials, attractive presentation of particulars regarding the sources of raw materials, their price, production and movements etc. etc. are necessary for drawing public attention to the need and possibility of industrial development. A lump sum has been provided in the budget for the year 1938-39 and before long steps will be taken to lay the foundation of a museum.

CHAPTER III.

Chemical Section.

10 General observations.—Previous reports recorded expansion of the activities of this section and in the year under report the pace of expansion was well maintained. In the Industrial Research Laboratory where the constructive work of the section is carried on additional accommodation had to be provided to meet the requirements of the growing activities. Towards the close of the previous year a direct heated soap boiling pan with specially built furnace to use coal coke or wood as occasion requires was installed in a shed constructed for the purpose. In the year under report considerable use was made of this soap boiling unit which was of a semi-large size to test as far as possible under factory conditions the efficiency of improved processes of manufacture of grained soap evolved in the Laboratory and at the same time afford the students under training opportunities to gain experience of soap boiling on a semi-commercial scale.

The scheme of systematic research on varnishes and allied products drawn up by the Industrial Chemist some years back and administratively approved by

Government had so long been awaiting the provision of funds. Provision has however been made in the budget for the year 1938-39 and to facilitate the launching of the scheme in the same year a special shed was built in the compound of the Industrial Research Laboratory towards the close of the year under report for the accommodation of the Varnish Department. In order that it may be possible to give effect to the scheme as soon as formal orders of Government are communicated the preliminaries for assembling the necessary plant etc. were attended to in the outgoing year. The scheme provides for the training of students in some of the branches and for the prosecution of research by the staff on problems connected with the various aspects of the manufacture of varnish, japan, enamel, paint, printer's ink etc. etc.

11 Research.—The research activities of the section were concerned as in the past years with a number of industries the importance of each of which was judged either from its capacity to consume indigenous raw materials not properly or at all utilised or to provide remunerative occupation to the people of the Province or again from its suitability for adoption by persons possessing some education but limited means. Considerable ground was covered in each subject of research in the course of the year. Some of the subjects were continuations of the work carried on in the previous year while others were fresh items taken up for investigation in the year under report. A brief resumé of the items of research completed in the year under report is given below followed further down by items that engaged the attention of the staff and were in progress at the end of the year.

12 Items of research completed.—

In connection with the manufacture of writing ink the following items of research were completed —

- (i) Standardisation of the method of preparation of writing ink from gallotannic and gallic acids
- (ii) Determination of the tannin content of selected vegetable bodies viz *Tournefortia*, *Myrobalan*, *Bahera* and *Amlaki* and availability and suitability of the tannin in the manufacture of writing ink

- (iii) Study of the nature of hydrolysis affecting the percentage of tannic and gallic acids in connection with ink manufacture

The following items of research were completed in connection with the manufacture of varnishes and allied products —

- (iv) Determination of the order of efficiency and optimum proportions of linoleate driers, individually and in combination in connection with the manufacture of varnishes
- (v) The precipitation method of preparation of linoleate driers and their dissolution in raw linseed oil
- (vi) Special treatment of linseed oil for preparation of a quick-drying japan
- (vii) Properties of japan made from a common raw material like 'dhoona'

The items of research noted below were completed in connection with the researches on the manufacture of metal polish and adhesive pastes respectively —

- (viii) Determination of the basis of a good metal polish
- (ix) Construction of a suitable apparatus for testing the sticking strength of adhesive pastes

13 Items of research in progress.—In connection with the manufacture of writing ink the following item of research was in progress at the close of the year —

- (i) Application of the results of research on the manufacture of writing ink from indigenous vegetable bodies to semi-large scale charges

The item noted below was in progress in connection with the manufacture of varnishes—

- (ii) Further study of the driers in connection with the manufacture of varnishes

The following items continued to engage the attention of the staff in connection with the soap manufacturing industry —

- (iii) Manufacture of cheap transparent soap without the use of alcohol.

- (iv) Examination of the limitations of the process of incorporating filling materials in small charges of salt-cut soap
- (v) Determination of a method for the accurate estimation of the free alkali in finished soap

The metal polish industry was responsible for the following items of research in progress.—

- (vi) Study of the factors necessary for keeping silica powder in perfectly emulsified condition in connection with the manufacture of metal polish
- (vii) Contributions made by free oleic acid to the cleansing power of a metal polish

The item given below was pursued in connection with the manufacture of adhesive pastes.—

- (viii) Regulation of temperature of re-action for production of superior grade of adhesive pastes

The liquid disinfectant industry claimed the following items of research in progress —

- (ix) Preparation of larvicides in connection with the study of disinfectants
- (x) Determination of the scientific basis governing the relation between the specific gravity of Creosote oil and the proportions of the other ingredients in the manufacture of liquid disinfectants

products from the village method of manufacture of common salt to the highly developed manufacture of caustic soda and bleaching powder, making in each case a start from the same raw material viz brine. A number of these enquiries emanated from a desire to do something industrial not backed up by the mental equipment necessary to face squarely the uncertainties inseparable from an industrial career so that the enquiries lacked *bona fide* and were not meant to be followed up. A number of enquiries may also have originated in connection with the search for industries suited to the temperament and resources of particular individuals. Even after making allowances for enquiries of the above types there would still be left a large number of enquirers who may, not unreasonably, be expected to try out industries selected by them or effect improvements in manufacturing methods in the manner advised at their request.

The large number and variety of the enquiries make special mention difficult. An attempt is made below to particularise those industries which attracted the largest measure of the attention of the industrial or industrially minded public.

The paper industry in its various branches paper paste-board card-board and straw board, their raw materials and manufacture abrasive papers like sand paper and emery paper, stationery and card-board manufactures, attracted a good deal of attention from industrialists actual or prospective big and small and urban as well as rural. Next came the industries of disinfectants insecticides germicides etc. The dairy industries also claimed a good number. The cocoanut industry its plantation the production of the oil and copra new and extended uses of the latter never uses of the shell etc. accounted for a respectable number of enquiries. The comparatively new industries of celluloid bakelite ebonite vulcanite etc. formed the subject matter of several enquiries while the tobacco industry the curing and blending of leaf tobacco for purposes of cigar and cigarette making was responsible for a number of the enquiries. The sugar industry gave rise to a number of references mostly concerning the production of sugar on a factory basis.

At the request of several firms and individuals manufacturing new lines of chemical products the scientific examination and test of the same were arranged with the Public Health Department, the School of Tropical Medicine, the All-India Institute of Hygiene, the Government Test House Alipore, etc

15 The views and recommendations of the Department were forwarded to Government in connection with the following schemes and proposals received from Government or other departments or from private bodies or individuals —

(a) A scheme sponsored by a certain member of the Legislative Council for utilising agricultural cattle in crushing mustard seed in areas where cattle have no work for the greater part of the year

(b) A scheme, originating in a report of survey and settlement operations in Bengal of utilising available land in raising plantations of date palm for purposes of production of sugar at a cost lower than in the case of sugarcane

(c) The proposal of a firm for manufacture of bitumen and allied products from imported crude oil and for that purpose the duty-free entry of the latter material

(d) The question under examination of the Tariff Board regarding the desirability or otherwise of the continuance of the protection granted to the indigenous magnesium chloride industry with particular reference to the effect of the same on the textile and other industries consuming the said material

(e) On a reference from the Industrial Research Bureau of the Government of India regarding the conduct of a technical survey of the oil seed crushing industry with a view to its improvement, a scheme for conducting the survey was submitted to Government

Towards the close of the year under report the possibilities of the development of the hand-made paper industry of the Province was receiving attention

The Industrial Chemist visited Dhulian Ganges in the district of Murshidabad which was at one time a busy centre for the manufacture of paper. Local report went to show that less than fifty years ago over five hundred families of paper makers used to ply their craft at Dhulian and neighbouring villages. The industry has, however, almost disappeared and of the five hundred families only three are now struggling on with their ancient trade. Of these again two families have almost given up the struggle and one is making paper off and on. The formulation of a scheme for the development of the handicraft of paper making as a whole time or subsidiary occupation for the rural population was taken in hand at the end of the year

At the request of the Commissioner of Excise and Salt and in connection with the credit issue of banderolls to a certain match factory, the factory was inspected by the Industrial Chemist and the Department's recommendations were forwarded to the Commissioner

16 **Demonstration and training under the Unemployment Relief Scheme.**—The four soap-making demonstration parties under the above scheme were fully occupied with the training of new batches of students both in Calcutta and in the mufassal. In Calcutta, the number of candidates from all parts of Bengal offering for training in the Industrial Research Laboratory continued to be large and of the two parties stationed there one was assigned particularly to above Thirty-six students received a thorough training in the Industrial Research Laboratory

The parties operating in the mufassal trained students at the following centres, viz —

Chaumuhani (Noakhali), Purandarpur (Birbhum), Kishoreganj (Mymensingh) and Barisal (Barkaganj)

In all 79 young men were admitted to the course of training which was completed by 54 of them and about half the number completing was absorbed in the industry either as proprietors of small soap works or workers in the same. The party stationed for the time being at Barisal participated for a short period in the industrial exhibition held at Bhola in the same district

CHAPTER IV.

Engineering Section.

17 General.—Industries, mostly of the handicraft class, used to support in Bengal, as elsewhere, large numbers of the population. Remarkable developments in methods of production have, however taken place in most countries in the last half century and enabled their handicrafts to maintain existence in an intensely competitive field. In Bengal, the competition has been no less intense, but modernisation of production has been conspicuous by its absence. The result is, not stabilisation, but gradual extinction of the handicrafts. The revitalisation of the struggling handicrafts and resuscitation of the extinct ones require the introduction, where possible of modernised means and methods of production within their capacity. One of the chief objectives of this department is to assist in bringing about such a development.

During the year under report, the normal functions of the Engineering Section continued to be performed with energy and vigour. For want of a permanent subordinate staff and separate provision of funds both research and routine work of the section have hitherto been carried out with the assistance of the staff of the Unemployment Relief Scheme demonstration parties (Engineering Section) stationed at the Industrial Research Laboratory. As, however, training of students is the principal duty of these demonstration parties, they were naturally unable to devote to research as much time and attention as they might otherwise have done. Even with limited resources, the section tackled and solved quite a large number of industrial problems with satisfactory results.

18 Metal casting and polishing.—Experimental work in the Electroplating Section attached to the Metal Casting Department of the Industrial Research Laboratory is most encouraging. Careful manipulation and proper immersion of brass and cutlery articles for a longer period with a current of low voltage is found to throw better deposits of metal on them. The electroplated articles that are now produced at the Laboratory are far superior to those produced elsewhere in the market not in

respect of quality of finish alone but the plating is also more durable due to the "slow deposition method" without however, increasing the manufacturing cost. In metal casting proper experiments were carried out in the manufacture of various types of building fittings in simpler and more economical methods. Some new and attractive designs were also introduced into the course of instruction for the students under training. Calculations of voltage deposition of anodes on non-ferrous alloys in medium thick quality, with minimum consumption of raw materials and bright final finish, were the subjects of foremost importance for the students under training. In the fitting and polishing section some practical lessons were given to the students on the manufacture of electric wall brackets and table stands of novel designs along with the usual course of demonstration. In the Electroplating Section further experiments were carried out on detergent properties of elements, both acidic and alkaline for the purpose of a thorough cleansing of the surface of articles of a complicated nature i.e., those not suitable for bob polishing. The above experiments gave satisfactory results in regard to better deposition and general finish of plated articles.

19 Cutlery.—In the Cutlery Section experiments were conducted with a view to standardising different kinds of articles and reducing their cost of production. As a result, several alterations were made in the old dies and jigs, while a few more were designed and put into operation so as to diminish manufacturing cost. Experiments on silver and nickel-plating have also yielded encouraging results. Certain new types of horn and fibre handles were introduced to the students under training. Considerable improvements were effected in the quality of productions including their design and fittings. Attempts were made to manufacture some table cutleries with stainless steel strips and the results were a success. Experiments in electroplating were carried on and very encouraging results have so far been obtained. The manufacture of some new designs of toaster, fork, kitchen fork, cook's knife etc. was taken up. A special type of nut cracker with spring attachment was designed. Designing of some musical instruments was also taken up and articles of a good standard were produced.

20 Umbrellas.—In the Umbrella Section a lathe has been installed with a view to training students in the manufacture of wooden handles of fancy designs. Parasole and lady's umbrellas of various designs that command a good market were manufactured at the Laboratory and the improved methods of manufacture evolved by this department were also successfully introduced among the factories encouraged into existence as a result of training imparted under the Unemployment Relief Scheme. Practical lessons on the manufacture of umbrellas from indigenous bamboo sticks, canes and wooden handles were given to the students. The wooden handle of fancy designs which is largely used in umbrella and parasole manufacture and commands a good sale is finished on the lathe with much convenience and saving of time. The students were also given lessons in the marketing of umbrellas. During the year under report the party at the Industrial Research Laboratory participated in the Sui Industrial and Agricultural Exhibition, and gave demonstrations to the public in the manufacture of different varieties of umbrella sticks. The marking on sticks was specially appreciated by the public. Another umbrella party took part in the Agricultural and Industrial Exhibition at Brahmanbaria.

21 Pottery.—In the Pottery Section experiments were conducted to standardise the manufacture of stoneware jars, sanitary wares, earthen and semi-porcelain wares of underglaze and overglaze colours. Experiments were made in the manufacture of porcelain, parian busts, figures and artistic designs and such other articles that appear to have a prospective market both in and outside the Province. Experiments were made to standardise methods of manufacture for the varieties of pottery attainable in ordinary kilns. Important progress was also recorded in clay research. Samples of clay collected from different parts of the Province were analysed with a view to ascertain their suitability for the manufacture of wares of different shades and glazes, and as a result it was found that the clay from the Suseria Hills of Bankura excelled all other samples in respect of hardness and susceptibility to various glazes. It appeared, therefore, that very high class glazed articles of good

lustre and durability could be manufactured from the Suseria clay, provided 10 per cent China clay and 5 per cent limestone were added to the body for increasing plasticity. Experiments were also conducted to develop metallic lustre on porcelain, earthen wares and glazed articles of common clay. Arrangements were made to produce a reducing atmosphere in the kiln, in course of firing, for the purpose of reducing the metallic oxides present in the glazes to the corresponding metals and thereby imparting a metallic lustre to the wares. The pottery wares of different metallic lustre appeared to command high price in the market and for this reason the manufacture of these articles on a semi-commercial scale was successfully carried out at the Laboratory. The influence of atmosphere in the kiln during firing which recently attracted special attention in the pottery world as being one of the main factors in the matter of producing glazes of beautiful lustre by the process of reduction was further studied in the Laboratory by means of experiments. The behaviour of atmosphere inside the kiln during glaze firing is responsible for imparting different kinds of lustre and gradations of shade even to glazes having the same chemical composition. This is due to the circulation of the hydrocarbonaceous gases which can easily diffuse through fire clay saggars at rates higher than oxygen and give peculiar shades to the glazed articles of the same composition by partially or completely reducing the metallic oxides present in the glazes to metals. The experiments carried out in the above line seem to be very promising and interesting results are likely to follow. An original paper on the subject has been submitted to the Industrial Research Bureau, New Delhi, to compete for the prizes offered by the Bureau for papers dealing with research of industrial importance.

Steady progress was made in standardising several Rockingham glazes suitable for common plastic clay obtainable from various parts of the Province. A new semi-commercial scale pottery furnace was erected during the period and is now being regularly worked with satisfactory results. Facilities were given to the students for learning both the manufacturing and the commercial side of the pottery industry. The semi-commercial pottery kiln was regularly charged and fired for biscuit

and glazes by the students under training

Owing to the extensive use of enamelled wares for utensil purposes and the large demand for such wares in the market experiments were undertaken in the Laboratory to develop enamels on cast iron and steel utilising cheap local raw materials. Experiments carried out so far in this direction seem to be hopeful.

22 Technical enquiries dealt with by the Engineering Section were varied in nature. With the expansion of the activities of the Department of Industries both the general public and business people are taking an increasing interest in the work of the Department and the Engineering Section, as one of the principal technical units of the Department, had for its share a very large number of technical inquiries to dispose of. The nature of these enquiries ranged from the making of shirt buttons to the manufacture of motor cars. Besides these formal enquiries the Industrial Engineer himself informally disposed of a large number of technical questions by personal visits and interviews.

23 The operation of the demonstration parties working under the Unemployment Relief Scheme continued. The statement below shows the results achieved by engineering demonstration parties during the year—

	Name of Industry				Total
	Umbrella making	Metal casting	Cutlery	Pottery	
1 Number of parties	4	4	4	4	16
2 Number of centres served	5	4	4	4	17
3 Number of students admitted	101	61	64	70	296
4 Number of students trained	68	27	25	40	160
5 Number of students reported to have found employment in the existing factories or in industrial establishments	11	12	8	4	35
6 Number of factories reported to have been started	2	3	1	1	-
7 Number of students under training on 31st March 1935	10	46	21	36	113

Of the many difficulties the demonstration parties had to contend with the following three are worth mentioning—

- (1) Most of those who join the training classes do so with the primary object of securing jobs

under the Government. The number of such jobs being limited the first enthusiasm of these boys is followed by disappointment which spreads to potential recruits to the training classes.

- (2) Those who are genuinely anxious to start business on completion of training are seriously handicapped for want of capital. The facilities offered by the State Aid to Industries Act are rarely taken advantage of by these boys, who are deterred by the conditions imposed under the Act.
- (3) The problems of the supply of raw materials and the disposal of finished products often prove too great for the average boy trained in the demonstration parties stationed in mufassal centres.

This department has been endeavouring to overcome these difficulties by coming into personal contact with those genuinely interested in starting business and by rendering them all possible technical help and guidance.

24 **Exhibitions**—Finished products of the Engineering Section were sent for display and sale to the various exhibitions listed in Chapter VIII of this report. These products were in good demand and received appreciation from the public. Some of the demonstration parties held practical demonstration in a number of these exhibitions. In fact, the demand for practical demonstration in the various exhibition centres was so great that with the limited resources at the disposal of the Department it was found impracticable to comply with all the requisitions received.

25 **Work of artist designers.**—Two Artist Designers—one for the Textile and the other for the Engineering Section continued their useful work during the year under review. The main function of these designers was to produce attractive designs both for demonstration parties and for cottage workers. In these days of rapidly changing fashion and taste the entertainment of artist designers has become a prime necessity not only for cottage workers and small industrialists but also for textile mills and large industrial establishments. A design which is novel and attractive to-day becomes antiquated to-morrow and

loses public patronage. A continuous supply of new designs is therefore required by all industrialists who intend to hold their own in the competitive market and hence almost all modern textile mills and large industrial establishments have to maintain a staff of expert designers in their establishments. The pool cottage workers and small industrialists are unable to make such provision unassisted and it is therefore necessary, if they are to survive the competition of better organised rivals, that some provision such as is made by this department should be made to assist them. The work of the two artist designers was considered so important a part of the developmental organisation for the development of cottage industries, that Government was moved to sanction the permanent retention of these two posts. The proposal is, under the consideration of Government.

26 Work of Industrial Surveyors.—

These two officers who were originally appointed to collect economic facts relating to the present position and future prospects of the various industries in different parts of the Province, continued to discharge their duties satisfactorily. It has been the policy of this department, before drawing up any scheme for the amelioration or development of any particular industry, to make a thorough study of the existing conditions of the availability of the necessary raw materials and of the prospective finished products. In carrying out this policy, the data and information collected by the Industrial Surveyors have been of considerable importance and usefulness to the Department. During the year under review two important survey reports were completed namely, Survey of Sugar and Blass and Bell-metal Industries in Bengal. The publication of these two reports is now under consideration. The surveyors also investigated the position and prospects of the pottery and the glass industries in Bengal. In addition to their normal duties, the surveyors were often called upon to assist in the disposal of industrial and trade inquiries received in the Department and to attend exhibitions in different parts of the Province to represent this department and to explain its activities. These officers have also to act in liaison between this department and the district industrial organisations. In this respect

their services are of importance specially in the matter of organising district industrial associations. For want of an inspecting staff for the Unemployment Relief Scheme, the Industrial Surveyors are often required to visit demonstration parties posted in different parts of the Province with a view to watching the progress of work and also to ascertaining the after-career of trained students. The Industrial Surveyors had also to inspect certain firms in connection with the administration of the State Aid to Industries Act.

During 1937-38, Mr P. Das Gupta and Mr R. Hakim, Industrial Surveyors, were on tour for 114 and 106 days respectively.

27 Assistance to other provinces.—

The Governments and the public of other provinces have taken an increasing interest in the activities of this department, particularly in the operation of the Unemployment Relief Scheme and numerous references were received from outside the province and duly replied to. Requests were also received from a number of provincial governments to train their stipendiary students in the different industries with the help of the demonstration parties working under this department. These requests in most cases were complied with and a *pro rata* contribution of Rs 250 per course was charged for every student thus accepted for training, with the sanction of Government.

Number of students from other provinces trained by this Department during 1937-38 —

Name of province	Name of industry	Number of students
1 Madras	Pottery	1
2 Assam	Umbrella	1
	Pottery	1
	Metal casting	1
	Boot and shoe making	1
3 Orissa	Umbrella	1
	Metal casting	1
	Pottery	1

CHAPTER V.

Weaving Section

28 General.—During the year under report weaving and allied industries made tangible progress in Bengal. The middle class people, both Hindu and Muslim, continued to take interest in this industry which is the most important cottage industry of the Province. It can now be opined that weaving is no longer confined to caste weavers but is

gradually being adopted by the middle and cultivating classes as a spare-time or subsidiary occupation

The number and composition of the demonstration parties remained the same as in the previous year except for the addition of three parties towards the middle of the year under the Government of India Development of Handloom Weaving Industry Scheme. This brought the total number of parties to 16

As usual the parties did not restrict their activities to demonstration and propaganda alone but rendered every help to the students to put their training to the best use. The demand for the services of the parties from various parts of the Province and the repeated requests for extension of the allotted periods of demonstration at the centres of demonstration provided an index for gauging the extent to which the demonstrations were appreciated by the people

29 Demonstration and training in Weaving and Dyeing.—During the period under review the four weaving demonstration parties (general) held demonstrations at 10 centres in the districts of Nadia, Jessore, Faridpur, Hooghly, Murshidabad and Calcutta trained 107 students and before moving on to the new centres of work introduced the following improved appliances —

Fly-shuttle looms	12
Jacquards	5
Semi-automatic looms	3
Carpet weaving frames	7
Tape loom	1

Training was given in various branches of weaving and also in dyeing and printing of jute, cotton, silk and wool

The Dyeing Demonstration Party gave its students a special training in the dyeing of cotton, jute and worsted yarns with colours of different groups and in calico printing with blocks, stencils and spray in addition to weaving fine designs on Jacquard looms. The party gave demonstrations at two centres in the districts of Howrah and Jessore trained 31 persons and introduced among them 15 fly-shuttle looms and 2 carpet weaving frames. Besides this 22 trained men opened dyeing and printing concerns in the year under report

30 Jute and wool weaving.—During the year the two jute weaving parties held training classes at Lakshipur (Noakhali), Dewanganj (Mymensingh) and Basirhat (24 Parganas). They trained 28 young men and 10 were still undergoing training under the first party whilst the second party was under orders of transfer to a new centre. The persons who took advantage of the training classes belonged to the cultivating and middle classes

As a result of these demonstrations 10 small factories were reported to have been established and 25 students carrying on their own business in the profession whilst 3 students found employment in the existing factories

The following looms and appliances were introduced —

(1) Looms for both cotton and jute weaving	23
(2) Jute carpet weaving frame	1
(3) Jute spinning wheel	1

The trained students of the jute weaving parties are manufacturing jute rugs, table covers *shatranji*, *suzni* floor mats, marketing bags, nets, carpets, *ashans*, *jainamaj*, badminton nets, etc., almost all of which articles find ready market in the locality

The two wool weaving demonstration parties held training classes at Kolaghat (Midnapore) and Karanjali (24 Parganas). They were at the end of the year working at Contai (Midnapore) and Futigoda (24 Parganas). Each party has two sections viz. weaving and knitting. The two parties trained in both the sections 30 students and 40 more were under training at the close of the year

The following numbers of looms and appliances were introduced among the trained students of the weaving section —

(1) Fly-shuttle frame looms	11
(2) Fly-shuttle pit loom	1

As a result of the demonstrations 6 small weaving factories were started engaging 17 of the young men trained. In addition to these 10 others found employment in industrial concerns. The men trained under the wool weaving parties are manufacturing woollen wrappers, fancy bordered woollen shawls, mixed wool and silk fancy bordered sarees, mufflers, mixed shirting

and coating cloth of wool and cotton,
woollen carpets, etc

15

31 Knitting.—The knitting sections attached to the two wool weaving parties held training classes simultaneously with the wool weaving parties and at the same places. Both male and female students were admitted for training. They were trained in the art of manufacturing cotton and woollen hosiery, goods such as socks, stockings, mufflers, tubular banding, etc. As a result of these demonstrations 4 knitting machines were introduced helping specially the womenfolk of the country side to earn a pittance by working in their leisure hours.

32 Coir weaving.—The four coir weaving demonstration parties completed the third year of their work. They demonstrated that the cocoanut husks usually thrown away as of neither value nor use or burnt as fuel, can be made a source of income as raw materials for the manufacture of useful and saleable articles by one who has undergone a short course of training. As a result, several small scale coir manufacturing concerns have been started in the localities where the demonstration parties worked.

Educational institutions, some of which had as stated in the last report, opened special sections on coir spinning or weaving or were taking steps to that end, continued to take a keen interest in the development of the coir industry. During the year under report the work of demonstration was carried on by the four demonstration parties at 4 centres in the cocoanut growing districts of Howrah, Khulna, Bakarganj and Noakhali. Sixty-four persons were trained of whom 35 took up the coir business as their profession. At the end of the year the parties were working at Shohagdal (Bakarganj) Hatiya (Noakhali), Mulghar (Khulna) and Bauria (Howrah). Fifty-three persons were receiving training in those centres.

The following improved appliances and looms were introduced among the persons trained —

(1) Ginning machine	1
(2) Coir spinning wheel	22
(3) Coir mat weaving frame,	50
(4) Coir mat loom	1
(5) Coir matting loom	2
(6) Willow and combing machine	1

It is gratifying to note that some 20 small establishments have been started for the manufacture of coir goods as the result of continued propaganda and demonstrations. The industry possesses features which attract to it the cultivating as well as the non-cultivating classes.

33 As regards the three additional weaving demonstration parties, these were formed at the beginning of August 1937 and they commenced work at three different centres, viz. the Calcutta Technical School, Madhabpasha (Bakarganj) and Wazirpur (Bakarganj). The party at the last named centre was subsequently compelled to move to Bhola (Bakarganj) in the month of November. At the end of the year 53 students belonging to different communities were under training. As the course of training covers a period of 8 months the training was continued to the next year. Training in the manufacture of *dhuties*, *sarees*, bed covers, towels, *chadars* of cotton yarn and varieties of silk, wool, jute and mixed fabrics was being given.

34 Exhibitions.—During the year under report two jute weaving demonstration parties and two coir weaving demonstration parties participated in the exhibitions held at Dacca, Rangpur, Jamalpur (Mymensingh), Midnapore and Rayekati (Barisal). The demonstrations given were greatly appreciated both by professional workers and the general public. The products manufactured found ready sale on the spot. In addition some of the Head Masters of the District Weaving Schools and some instructors of the Peripatetic Weaving Schools were invited to participate in the exhibitions held at Pabna, Husainpur (Mymensingh), Suri, Duharjpur (Birbhum), Jamalpur (Mymensingh) and Chittagong which they did.

35 Supply of new designs.—As regards the prospects of the products of handlooms, tasteful designs are important factors in finding a ready and wide market. The textile artist designer of this department drew up during the year under report various attractive and novel designs for cotton and silk *sarees*, woollen shawls, table covers, *jarnama*, screens, coir mattings and door mats, etc. These designs were woven up and put into commercial use by the demonstration parties and by the District and the Peripatetic Weaving Schools and

had a very good reception, the articles made according to the designs being readily sold at higher prices

36 Butidar saries.—The Department continued its efforts at resuscitation of the art of weaving *butidar saries* which are fine specimens of the products of handlooms. Of the two young men who were provided with special facilities to learn the art from its only surviving exponent, one carried on practical researches in the line at the Government Silk Weaving and Dyeing Institute, Berhampore, and was progressing satisfactorily at the end of the year

37 Research and experiments done by the demonstration parties.—The experiments undertaken in the previous year in connection with the manufacture of coir double belting and figured coir mattings with the help of Jacquard attachment were successfully completed during the year under report. The results show that in coir weaving it is much easier to work with a Jacquard attachment than with ordinary bealds and this development constitutes a great innovation in the coir industry and opens out new lines of manufacture of figured coir goods with less trouble and at cheap cost

38 Research and experimental work at the Government Weaving Institute, Serampore.—The research unit originally consisting of one expert textile organiser, two artisan assistants and one workman labourer established at the Institute for the development of the handloom industry of this province under the Government of India scheme, was further strengthened during the year under report by the addition of a textile draftsman, two artisan assistants, one dyeing assistant, one laboratory bearer, one machinshop assistant and a peon

The party was fully occupied in producing samples of furnishing fabrics, *saries* with fancy borders and other useful woven goods for domestic use with a view to finding out the most economical way of manufacturing them by the handloom weavers of Bengal. It is understood that certain types of the fabrics based on samples produced by this section are being manufactured on a large scale and marketed by the Bengal Home Industries Association Calcutta

The party also improvised a double shuttle sley for the manufacture of two pieces of cloth side by side. It has also devised a harness releasing motion to facilitate the weaving of cross borders with Jacquard and heald attachment by this arrangement spot effect on the ground and Jacquard designs on the border after the Benares style can be woven up conveniently

39 The difficulties or handicaps of handloom weavers and the steps taken to remove them.—The weaving industry has suffered from the proverbial conservatism of the weavers and from their ignorance of changes of taste and of the widening field. Weavers have adhered to the lines of the production of past generations and have failed to take advantage of the expansion of the market that has taken place in the meantime. By the persistent efforts of the Department through its demonstration parties and the District and Peripatetic Weaving Schools, the handloom weavers have gradually come to realise the value of a forward policy and in some areas of the Province, during the year under review, they started producing miscellaneous goods such as towels, *ashans*, table cloths, woollen wrappers, shirting, *suznies*, sheetings etc., for which there is an increasing demand in the market. The future of handloom weaving depends to a great extent on the widening of its range of production but the activities of the Department cannot be expected to cover a wide area until the number of its demonstration parties is appreciably increased

40 Report on the survey of handloom weaving industry in Bengal.—The report on the survey of handloom industry conducted by a Special Officer under the Board of Economic Enquiry is a piece of useful work, but the survey has not been sufficiently wide in its scope the actual field investigations being confined to eight districts. In view of the fact that the handloom industry is the most widespread of the cottage industries of Bengal employing a large number of the rural population steps should be taken to make an intensive survey into the economic and other aspects of this industry on a provincial basis. An enquiry of the kind suggested would reveal many interesting facts which would make it possible to understand more clearly the various

problems of this industry, its difficulties and requirements and would enable specific measures to be adopted

17

41 **Assistance given to the public in respect of the weaving industry by the Government Weaving Institute, Serampore.**—The Principal of the Government Weaving Institute, Serampore, received several requests for help in regard to various aspects of the weaving industry. He furnished particulars regarding the processes for metallic printing and dyeing of woollen cloths in different shades. He also furnished estimates of cost for the starting of dyeing and printing concerns on a small scale. Lists of reference books on textile subjects, the names and addresses of firms who supply improved handlooms and appliances and other textile machinery for the manufacture of special types of fabric such as braid and lace designs for table covers and *sari* borders were also supplied by him. Eighteen cases of police exhibits were examined by him during the year under review.

scheme was drawn up for converting the existing Silk Weaving and Dyeing Institute into a well-equipped Technological Institute for providing to the students a thorough training and spreading over three years, in improved methods of processing, weaving, dyeing and finishing. In addition to the measures described above, a scheme is in hand for organising the silk weavers into guilds and for arranging for standardising the entire produce of the guilds for finishing, conditioning and marketing which funds have been provided for in the budget. An economic census of the silk weavers with a view to obtaining facts and figures for the formation of guilds was undertaken but not finished during the year.

43 **The sericulture industry.**—The cocoon raising industry or sericulture proper is dependant on favourable weather conditions and on the absence of disease among the worms. In the Malda district the weather in the first half of the year was favourable enabling successful crops to be reared. Floods about September-October interfered with rearing, damaged the mulberry and delayed the annual root-pruning. Unusual showers after the root-pruning affected the new growth which suffered in quality and were partly responsible for the failure of the debilitated *choto-polu* worms usually reared about November. The failure of this crop checked the process of revival observed earlier in the Murshidabad and Birbhum districts the first half of the year was characterised by drought which was many rears to reject their worms for want of leaves. The second half experienced unusually heavy rain which affected the mulberry and, consequently rearing. In spite of these adverse conditions the rears secured cocoons worth about ten lakhs of rupees which would have been nearly doubled had all the attempts at rearing been successful. There was a slight increase both in the number of rearers and in mulberry acreage.

As regards the other factor in the success or otherwise of rearing viz disease, a special enquiry was undertaken during the year to find out how far the present efforts of the Department towards the production and supply of disease-free seed have been successful and to what extent rears were utilising efforts benefiting by the results of such efforts. The enquiry revealed that for

CHAPTER VI. Sericulture Section.

42 **General.**—Prior to the transfer of the administrative control of the Sericulture Section to the Department of Industries the section concerned itself exclusively with the first stage of the silk industry, viz the raising of cocoons by the rearing of worms. Last year a beginning was made with the second stage of the industry viz reeling, by establishing the Peddie Reeling Institute at Malda. The Institute was further developed during the year by the addition of up-to-date Japanese reeling machinery and by the adoption of better methods of reeling which were demonstrated to the reelers in two silk producing districts. A scheme for establishing a raw silk and standardising raw silk was taken in hand and the erection of plant and machinery was nearing completion towards the end of the year. The development of the third stage of the silk industry viz weaving was also engaging the attention of the Department for without up-to-date machinery and improved methods enabling better production at smaller cost the industry cannot face competition. A

the different crops in the year the majority of the rearers varying from about 70 to 100 per cent were not making use of the departmental seed. The present policy of "seed cocoon" production and supply has been found to be unsatisfactory and requires to be replaced by a system of production and supply of disease-free eggs necessitating some change in the organisation and working plan.

44 Organisation of seed-production and supply.—The seven departmental nurseries with the help of 423 selected seed rearers produced and made available about 70 000 *Lahan* seed cocoons of which however only about 42 per cent was utilised by rearers though these used more and obtained the balance from village rearers. Efforts are however being continuously made to persuade the general mass of rearers to use the seed cocoons more.

45 Research and experiment.—

(a) The Botanical Research Officer carried out a preliminary survey of the mulberry in the different nurseries. District varieties of *Morus indica* were observable. Arrangements are being made to grow the varieties at one place in the Narayanpur Sericultural Research Station for purposes of study.

(b) *Mulberry bush versus tree*—Further definite figures were obtained from several nurseries which went to prove that the tree is the cheapest when grown on roadsides or embankments or in fallow or homestead lands in respect of which no particular rent charge is payable. Trees in fields in demand for general cultivation purposes are definitely more costly than bush.

(c) *Bush from seed versus bush from cuttings*—In the Berhampore nursery a plot of bush grown from seed has proved to be much more quick in growth than bush usually grown from cuttings. The method is being tried on a large scale.

(d) *Bush from seedling cuttings* is being given a trial.

(e) *Grafts*—Grafts planted in one-third and one-eighth acre plots in the Berhampore and Panchari nurseries grew satisfactorily. Grafts are being given a fair trial in all nurseries.

(f) The Biological Officer undertook selection of the following lines viz.

multivoltine *Nistari* and *Chotopolu* and univoltine *Barapolu*, into pure lines as mixtures have been observed. (2) production of a fixed multivoltine hybrid out of *Nistari* × *Italian* which has made some progress and maintenance of the newly introduced fixed hybrids *Nistid* yellow, *Nistid* white and *Nismo* and (3) acclimatising foreign univoltine races with a view to evolving first crosses with the existing races suitable for different places and seasons.

Nistid white and *Nistid* yellow are gradually being adopted by the rearers and the cocoons of these races are selling at about double the price obtained for the indigenous *Nistari* and *Chotopolu*.

(g) *Reeling and re-reeling machines of cottage type*—The treadle reeling machine, the newly devised re-reeling machine and the eight-basin economic oven were being adopted by three private parties. The improved croisure arrangement was tried in the country reeling machines. The raw silk produced was of a superior type owing to the elimination of dirt and better consolidation which however caused a slight diminution in yield and did not fetch a higher price in the local market. The method has not for the present been acceptable to country reelers.

46 Eri silk.—A census carried out in the Bogra district revealed the presence of 360 rearers who are spinners as well and produce about Rs 2 500 to Rs 3 000 worth of yarn annually. The Department helped in weaving of suit pieces and *chadars* locally from hand-spun *eri* yarn.

47 Government of India's subvention and programme of work with it—The subvention provides for (i) production and supply of disease-free eggs and for (ii) research for improvement of (a) mulberry and (b) worms. A further provision has been made for (iii) a research officer for diseases of worms and (iv) an agri-biochemist who will work on chemical problems connected with the research items. The staff engaged under (i) also carries out demonstration and propaganda.

48 Demonstration and propaganda.

The staff engaged in this work consisted of 4 Inspectors, 9 officers of the rank of Assistant Inspectors and 39 demonstrators.

They carried out the following work —

19

(i) 529,624 moths were examined in different circles and 457,608 good layings were supplied to the selected rearers whose rearings were also supervised. A total of 1,072 samples and 55,875 moths was examined to test the prevalence of disease in the seed crops of the selected rearers

(ii) In the three principal districts, viz., Malda, Murshidabad and Birbhum a total of 10,764 houses and 337,621 appliances were disinfected

(iii) In the same three districts 271 houses were improved by provision of ventilation and protection against the fly-pest

(iv) In the same three districts 639 demonstrations on improved methods of rearing were carried out in 139 villages

(v) Prompt measures were taken to deal with any disease which appeared in epidemic form. The number of cases in the Malda district alone was 120. The only disease which did not prove amenable to treatment was muscardine

(vi) Statistical information regarding cocoon production seed used by rearers and results obtained therefrom mulberry acreage, number of rearers, reeling basins and looms and economic information about the cost of mulberry cultivation, of reeling, reeling and weaving was collected. An economic census of silk weavers with a view to the formation of guilds was in progress at the end of the year

(vii) Agricultural loans for sericultural purposes were distributed and realisation of dues on account of these loans was made

49 **Sericultural training.**—Training in improved methods of rearing is imparted in two ways. Two schools are maintained for the purpose, one attached to the Berhampore nursery and the other to the Piasbari nursery. Rearers' sons are admitted into these schools and are paid stipends. When the

amount of the stipend was reduced to Rs 5 from Rs 10 some of the boys left. The amount was then raised to Rs 8 and five students completed the course. Another form of practical training is to engage rearers' sons in rearing work in the nurseries. About 150 were engaged during the year

50 **Sericultural education.**—Sericultural education of an elementary nature is imparted to boys and girls in 7 primary schools to which the Department makes monthly grants varying from Rs 5 to Rs 7. These schools were attended by 372 boys and girls, mostly rearers' children. The demonstration staff gave occasional lectures to 3,858 boys and girls in 128 primary schools

51 **Agricultural loans.**—An amount of Rs 6,698 was paid as loans to 771 rearers in the Malda district and Rs 3,084 was realised of past loans. In the Murshidabad district no loan was issued while Rs 2,179 was realised of past loans. In the Birbhum district no separate record was kept of agricultural loans given for sericultural purposes. Until all outstanding loans were realised no loans for sericultural purposes could be issued. No loans were issued in the Bankura district

52 **Rewards to selected rearers.**—During the year under report 194 rearers were selected in the Murshidabad, Birbhum and Malda districts for rewards amounting to Rs 10,000 for improving their houses for rearing seed cocoons

53 **Exhibition and publicity.**—Opportunity was taken to put up sericultural exhibits including improved reeling appliances in those district exhibitions and shows which were capable of furthering the cause of the sericultural industry

54 **Tours.**—Mr C C Ghosh, Deputy Director of Sericulture, Bengal, was on tour for 181 days, Rai Sahib S N Bose First Superintendent of Sericulture for 150 days and Miss M L Cleghorn, Second Superintendent of Sericulture for 45 days

55 **Miscellaneous.**—A meeting of the Bengal Silk Committee was held at Malda on the 27th September 1937. It discussed the programme of the work of the Department and also the working of the Malda Silk Union. The reorganisation of the Union was under consideration

The present development of the sericulture industry in Mysore was studied by Mr. C. C. Ghosh, who undertook a special tour in the State for the purpose.

Details about the working of the Sericulture Department and statistics about mulberry cultivation and rearing in nurseries, selected rearers' work, seed supply and working of the Peddie Reeling Institute are given in the report of the Deputy Director of Sericulture Bengal (*vide* Appendix V).

CHAPTER VII.

Tanning and leather industry section.

56 General.—The Department serves the leather industries of the Province through the Bengal Tanning Institute the activities of which are three-fold, viz. research training and propaganda. The institute has been instrumental in effecting an appreciable development in the tanning industry in Bengal. While progress has been made in all branches of the leather industry, the outstanding feature was the expansion of the production and export of chrome tanned shoe upper leather. The improvement of the technique of the production of this leather by the researches and training of the Institute has to a very large extent enabled the chrome tanning industry of Bengal to produce this leather of a standard acceptable in the overseas markets. The Institute has thus played an important part in the establishment of an export trade of chrome upper leather for the Province. This leather is now being sold abroad and is more than holding its own in competition with similar leather produced in Europe and America. To make the forcing of this leather in the international markets permanent it is essential not only to maintain but to raise the standard higher. This requires the resolution of technical problems occurring in manufacture and also continual improvement of technique to keep pace with the progressive leather manufacturers of the West. It is the policy of the Bengal Tanning Institute to direct to these ends.

57 A portion of India's production of chrome leather is exported to form an item of the export trade of the leather industry and

of the necessity for research, etc., and a few important features are mentioned below.

The export of chrome shoe upper leather, viz. box sides and box calf from Bengal and other parts of India is made principally to the United Kingdom. A quantity is also sent to other countries such as Burma, Straits Settlements, Iraq, East and South Africa, Cyprus and the Continent of Europe. Statistics are not available to show accurately the quantity of Bengal leather exported, because leather from other provinces is also shipped from Calcutta, but there is reason to believe that Bengal leather forms an appreciable portion of the total quantity shipped.

The following figures show the exports of box sides and box calf to the United Kingdom from India each year since 1931:—

		Quantity Sq. ft.	Value £
1931	..	3,400	2,000
1932	..	414,000	10,000
1933	..	3,651,000	111,000
1934	..	4,041,000	120,000
1935	..	4,517,000	122,000
1936	..	3,872,000	20,000
1937	..	11,714,000	40,000

The figures represent the combined export of box sides and box calf, the former constituting the bulk. The proportion of the latter has, however, been increasing fast as the following figures indicate:—

	Export of box calf	
	Actual Sq. ft.	Proportion of combined export Percent.
1935	1,000,000	15
1936	1,100,000	17
1937	4,250,000	25

Bengal had an adequate share in the export of both box sides and box calf.

It will be observed from the figures that the export in 1937 was about 3 million square feet larger in volume and £144,000 more in value than that in 1935. Under normal conditions of trade the year should have been one of prosperity for tanners in India, but an unprecedented worldwide slump in the chrome leather industry intervened towards the end of the year and deprived the Indian chrome tanners of their legitimate financial reward.

58. The quality of Indian box sides further improved in the year as can be judged from the comparative average prices of Indian box sides and German box sides during 1937—

	1937	1938
Indian box sides	51.17	51.17
German box sides	51.17	51.17

The difference in price between Indian and German box sides was about 11.12 in 1937 and 11.12 in the present year.

The average declared value of Indian box sides are given below—

	1937	1938
Indian box sides	54.17	54.17
German box sides	54.17	54.17

The difference, 11.12, indicates the superiority of the former to the Indian product. The latter requires further improvement to be equal to the German product.

Export of a large quantity of chrome is made and sold in India.

59. Among other varieties of chrome leather, sheep skins, deer, pig, and horse leather are produced in India but the manufacture of these has not been taken up on a proper scale. The consumption of chrome leather in India is definitely on the rise and there is also an export demand for chrome leather. A good deal of research work has been carried out at the Bengal Tanning Institute on glaze leather.

60. With regard to vegetable tanning, pride of place is to be given to sole leather from buffalo hides. Sole leather both of improved and old types is produced during the year and sold profitably. The trade depression did not affect this line. Sole leather of the improved type was produced by a process introduced by the Institute.

Quite a fair quantity of half-tanned leather was produced for export by a Calcutta tannery. The price of this leather rose in the first half and declined in the latter half of the year.

Some quantities of football, suit-case and fancy leathers were produced by vegetable tanning.

61. Among miscellaneous leather, chamor is to be mentioned, the manufacture of which increased during the

year under report and quite a large volume of business was done. Here again the Tanning Institute took the initiative in introducing this line of work to the local trade. A fair quantity of patent leather also was manufactured and sold by a number of small tanneries in Calcutta.

62. In the shoe industry the output of both leather and rubber shoes was well maintained during the first nine months but there was a setback towards the end of the year.

63. An account of the Institute's own activities in regard to (1) research (2) training and (3) demonstration and propaganda during the year 1937-38 is given below—

Research—Researches on operations involved in the manufacture of box sides

With the object of improving the quality of locally produced box sides researches were carried out for the solution of technical difficulties encountered in the different operations involved in their manufacture as briefly stated below—

(a) *Lime and delima*—Researches described in the reports for 1935-36 and 1936-37 showed that the quality of box sides improved by liming with sodium sulphide buffered with lime and sodium chloride and calcium chloride and by deliming with hydrochloric acid and salt. During the year under report fairly exhaustive bulk trials were given to these processes and corroborative results were obtained. The methods can therefore, be now recommended to the trade.

(b) *Tanning*—Researches begun the previous year were continued in the year under report on the removal of the crackiness of leathers in the tanning of which farina liquor had been used to impart fullness to poor hides and the effect of using sulphonated castor oil along with the farina liquor was studied together with the consequential changes needed in the fat-liquoring and subsequent processes.

(c) *Fat-liquoring*—A new formula for a fat-liquor was evolved and brought up to the stage of being recommended to the trade.

64. *Investigation on the manufacture of sole leather*.—With a view to reduce tanning cost, new processes depending upon larger use of *goran* bark were tried with satisfactory results.

Experiments were also conducted (i) for improving the process of manufacture of chrome picking band leather, (ii) to assess the comparative merits of *Kustia* and *Deshi* goat skins for manufacture of glace kid (iii) on the manufacture of morocco leather from wet-salted *Deshi* heavy goat skins, (iv) of chamois leather from wet-salted goat skins of rejection and inferior qualities and (v) of patent leather from wet-salted cow hides

65 Investigation on de-naturing common salt for curing hides and skins for preservation.—The investigation was continued and four recipes were tried out, two of which were found to preserve hides for 12 and the other two for 6 weeks

66 Examination of vegetable tanned sole leather produced in India for fixing the chemical specifications.—This examination was continued from the previous year with samples of leather from representative tanneries in India and the quality of the samples was assessed by chemical standards applied in England in recent researches on similar subjects. The results furnish data on which chemical specifications for Indian buffalo sole leather may be based. There are no well defined specifications in use in India and the trade experiences much inconvenience on account of their absence. The samples examined may be regarded as representative of the best leathers of this class made in India and the results yielded by them may very well specify the limits within which variations may be permitted. The following specifications are accordingly proposed pending corroborative tests —

	Acceptable range
(a) Degree of tannage	69 to 82
(b) Percentage of moisture	14 to 16.5
(c) Percentage of insoluble ash	0.23 to 0.50
(d) Percentage of fat	1 to 2
(e) Percentage of water soluble matter	4 to 8.5
(f) Percentage of hide substance	42.5 to 47.5
(g) Percentage of combined tannin	30.5 to 36.75

67 Influence of sodium sulphide in liming cow hides for chrome tanning—a photomicrographical study.—Microscopy now plays a very important role in leather technology. Every operation performed in the manufacture of leather effects considerable changes in its fibre structure. With a view to study the influence of increasing quantities of sodium sulphide on the fibre

structure of cow hides in liming, an examination of a number of sections of pelt pieces under the microscope was planned with particular reference to (a) water absorption or swelling, (b) thickness of fibres (c) splitting of fibres, (d) separation of fibre bundles, (e) general structure of fibre weave, (f) angle of weave and (g) thickness of grain layer. The work in this connection was in progress at the end of the year.

68 Training of apprentices.—On an average there were 23 apprentices on the roll of the Institute during the year, four from Bihar and the rest from Bengal. Six apprentices completed the course of training during the year including one from Bihar. All the six appeared at the final examinations and four passed. Of these, two passed in the first and two in the second division. This year's examination results brought up the total number of passed students of the Institute to 107. The number of apprentices known to be engaged in the trade is now 68 which is 63 per cent of the total number passed.

Training was imparted as usual through class lectures and practical work at the demonstration tannery and the chemical laboratory.

69 Demonstration and propaganda.—Demonstrations in improved methods of tanning were given at six centres in the Provinces during the period under report. Seventy-four young men of the middle class Hindus and Muhammadans and a few caste tanners were trained at the demonstration camps. Twelve of the men so trained are reported to have started tanning on a small scale.

The Institute participated in most of the industrial and agricultural exhibitions held within the Province during the year and displayed leathers, boots, shoes and leather goods such as suit and attache cases etc., all products of the Institute.

70 Boot and Shoe Making Department.—This section completed its ninth year of existence in the year under review. The craft of shoe and leather goods making is becoming more and more popular with the youths of Bengal through the activities of this department, as is evident from the increasing number of students seeking admission to the training class. As in previous years the number of applicants seeking admission exceeded available accommodation. On an average there were 18

students on the roll and 11 completed the course. Thirteen appeared for the final examination but only 6 passed one in the first, three in the second and two in the third divisions. This year's result brought the total number of students trained in the Boot and Shoe and Leather Goods Department to 69 of whom 60 per cent are reported to be engaged in the trade.

71 Boot and shoe making demonstration parties constituted under the Middle Class Unemployment Relief Scheme. The four peripatetic boot and shoe making demonstration parties held training classes at seven centres viz., Bholachang (Tippera), Rampurhat (Birbhum), Gobia (Jessore), Simketan (Birbhum), Pabna town, Patna (Chittagong) and Deobhog (Dacca).

The demonstrations at the first four centres were completed in the year and helped to train 11 youths of whom 23 are reported to have started business on their own account. At the last three centres the demonstrations were being continued at the end of the year.

Although the period of boot and shoe making demonstration is fixed at six months for each place this period had to be extended on several occasions at local request with the object particularly to help the learners to start business on their own.

Efforts were made to maintain touch with the trained students who had started business in the mufassal and skilled operatives of the demonstration staff were sent whenever wanted by such students to solve their technical difficulties.

CHAPTER VIII.

Industrial Enquiries, Marketing and Publicity.

72 Industrial enquiries.—The number of enquiries to which the Department had to attend during the year was larger than in the previous year and covered a wider variety of subjects reflecting the increasing interest taken by the people of the Province in its industries. Even at a moderate estimate there were no less than 1,000 *bona fide*

enquiries and references for information on matters ranging from the number of cocoanuts produced in Bengal to the possibilities of the manufacture of gas-masks in the Province. In the absence of a regular industrial intelligence section Mr A. Mukherjee, the Marketing and Publicity Officer, was entrusted with most of these enquiries.

In addition to enquiries from the public, a large number of references were as usual, received from the Director-General of Commercial Intelligence and Statistics, India, in regard to overseas trade in general or the status and financial standing of firms and individuals who wished to secure trade introductions abroad.

The Directors of Industries of various provinces and States also sought information on various subjects and their requests were complied with.

Among other officials who utilised the services of the Department may be mentioned His Majesty's Trade Commissioner in India, the Director of the Industrial Research Bureau, Government of India, consuls of various countries and a large number of the District Officers of Bengal.

As stated elsewhere, various measures were taken to assist persons and firms intending either to start a new industry or to extend and improve their business connections. The supply of dependable information formed an important part of these measures and every endeavour was made to help the enquirers by indicating the possible sources of raw materials, supplying particulars of reliable firms from whom machinery and appliances could be purchased and finding markets for the finished products.

73 Stores purchase enquiries.—As in previous years, the Assistant Stores Purchase Officer, United Provinces, the ContROLLER of Purchase Calcutta Circle, and the Director of Contracts, Army Headquarters, Simla, were at their request furnished with reports on the status and standing of a large number of factories and firms.

74 Marketing.—Considerable increase in the activities of this section was recorded during the year and the Marketing and Publicity Officer was called upon to furnish marketing intelligence or to put the producer in touch

with the buyer in respect of a number of commodities, such as —

- Umbrellas
- Rubber goods
- Woollen goods
- Condiments
- Chutneys
- Crayons
- Tube-well strainers
- Mat chips
- Metal ware
- Cutlery goods
- Paper and board
- Beads made from Bael shells
- Silk goods
- Silk yarn
- Hand woven textiles
- Hand-made paper
- Coir yarn and fabrics
- Jute products
- Earthen ware
- Tussoie silk

Present and past students of the weaving schools and demonstration parties under the Unemployment Relief Scheme were also helped as far as possible in marketing their finished products

The large number of exhibitions in which this department participated during the year afforded a good opportunity for the disposal of the finished stock of the training classes as well as of the factories of the ex-students

The business contacts established through the help of the Department at the successive All-India exhibitions held at Patna, Lucknow and lately at Lahore are reported to be still continuing and from what can be gathered, it seems that a fairly wide market has been opened out for the cottage products of this province, as a result of participation in those exhibitions

The Bengal Home Industries Association continued to serve the Department to some extent as an emporium for Bengal cottage industries products and was helped with the usual grant of Rs 18,000 in the year under report. The total sales effected through the Association amounted to Rs 62 225 during the year under review while the 'Good Companions' which was given a grant of Rs 3 000 for the year, was able to sell goods worth about Rs 21 954 mostly from the mission industries of the Province

75 Overseas market.—The London Committee of the Bengal Home Industries Association have been doing useful work in the sale of Bengal silks

and their stall at the last British Industries Fair was honoured by visits from Their Majesties the King, the Queen and the Queen Mother who made several purchases of Bengal silks. Her Majesty the Queen expressed her gracious interest in these silks by placing some more orders

Negotiations were opened with a firm for the export of Bengal handicraft products to New Zealand and a sample consignment has been shipped to that country by the Bengal Home Industries Association

Another firm is negotiating for the export of matting to Central America to be used for packing virginia tobacco while an assortment of Bengal cottage products is about to be shipped there for sale

76 Certificate of origin for the export of articles from Bengal.—A Calcutta firm represented to this department the difficulty it was experiencing in regard to shipping the products of its own manufacture to the port of Liverpool where the authorities were insisting on certificates from this department regarding the country of origin in respect of every shipment. The matter was taken up with the Indian Trade Commissioner, London, through whose intervention it was settled that a fresh certificate would not be required for every shipment

77 Industrial museums.—The question of starting industrial museums by the various District Boards of Bengal was discussed at the Commissioners' Conference and it was decided to request the District Boards to agree to the scheme

The District Boards of Murshidabad and Hooghly started museums, and replies from some other District Boards were encouraging

The Commercial Museum organised by the Corporation of Calcutta in conjunction with the Health Publicity Section of the Corporation served a useful purpose while the museum recently started by the Bengal National Chamber of Commerce is also a welcome addition to non official enterprise in this direction

This department made a grant of Rs 350 to the Corporation Commercial Museum in the year under review to help the collection and marshalling of Bengal exhibits for the various exhibitions participated in and in addition carried

the exhibits of the Commercial Museum free of cost and housed the same at the Bengal Court of the last All-India Exhibition of Arts and Industries held at Lahore

78 General publicity.—The publicity section of this department was able to maintain and improve the tone and tenor of its appeal to the public both general and industrial in respect of both the productive and the distributive activities of the various industries

The well-known slogan "Support Bengal Industries" and its Bengali equivalent were further popularised by a wide circulation of illustrated posters throughout the Province

Lectures, sometimes accompanied by lantern slides, were delivered by the Marketing and Publicity Officer at a number of places during the year

79 Films.—A sum of Rs 3,000 was allotted to this department for films in the year under report and a film on the activities of the industrial school at Sriniketan, Suriul (Birbhum), was produced in collaboration with the Publicity Department of Government

A new set of charts and exhibits was arranged in the Government publicity van and a representative range of exhibits kept permanently on view at the Commercial Museum, College Street Market, Calcutta

Leaflets, charts, posters and bulletins bearing on the subject of indigenous industries were freely distributed

All these measures went a long way in awakening and adding to the interest of the people in the industrial possibilities of the Province

80 Industrial Exhibitions.—During the year this department participated in no less than 38 exhibitions in some form or other

Mention may be made of the great Empire Exhibition to be held at Glasgow for which we have collected and shipped a consignment of ladies' handicrafts for show and sale

This department joined in the last All-India Exhibition of Arts and Industries at Lahore organised by the Government of the Punjab

In this exhibition our attempts were directed towards the collection and representation of the maximum number of industries from Bengal and the Bengal Court was considered one of the best of the Government pavilions in the exhibition

As it has been found increasingly difficult to cope with the demand for participation in exhibitions, Government was moved to augment the existing grant

A scheme for a moving exhibition was also submitted to Government as a part of the general programme of mass adult education

Government have been pleased to approve both the proposals and it is hoped to give effect to the details from the next year, 1938-39

Towards the close of the year a scheme was under consideration for a more effective participations in exhibitions in the rural areas with a view to encouraging mass adult education and the District Officers were being consulted in the matter

List of exhibitions participated in during 1937-38 —

Name and location	Date
1 Moara (Hooghly)	30 5-1937
2 Lahore	6-12 1937 to 22 1 1938
3 Brahmanbaria (Tippera)	8-12 1937 to 22 12 1937
4 Ananda Mela Dacca	12 12 1937 to 15-1 1938
5 Bajitpur (Mymensingh)	13-12 1937 to 21 12 1937
6 Baghbazar Calcutta	4 10 1937 to 21 10-1937
7 All India Educational Week, Calcutta	26-12 1937 to 30 12 1937
8 All Bengal Christian Conference	27 12 1937 to 30 12 1937
9 Kalkerek (Dacca)	20 1 1938 to 22 1 1938
10 Manikganj (Dacca)	30 1 1938 to 6-2 1938
11 Berhampore (Murshidabad)	10 1 1938 for a month
12 Hatosh Haripur Kushtia (Nadia)	14 1 1938 to 17 1 1938
13 Rangpur	23 1 1938 to 31 1 1938
14 Pabna	16-1 1938 for 15 days
15 Gopalganj (Faridpur)	16-1 1938 for a week
16 Faridpur	7 1 1938 to 31 1 1938
17 Jhenidah (Jessore)	7 1 1938 to 31 1 1938
18 Iswarganj (Mymensingh)	21 1 1938 to 27 1 1938
19 Habra (24-Parganas)	20-1 1938 to 2 2 1938
20 Hosainpur, (Mymensingh) Kishoreganj	22 1 1938 to 27 1 1938
21 Diamond Harbour (24-Parganas)	13-2 1938.
22 Krishnagar (Nadia)	3 2 1938 to 6-2 1938
23 Feni (Noakhali)	" 2 1938 for 10 days
24 Bhola (Bakarganj)	14 2 1938 for 3 weeks
25 Cox's Bazar (Chittagong)	1 2 1938 to 7 2 1938
26 Suri (Birbhum)	18-2 1938 for 10 days
27 Vishnupur (Bankura)	26-2 1938 to 2 3-1938
28 Midnapore	26-2 1938 for " days
29 Sriniketan (Birbhum)	6-2 1938 to 8-2 1938.
30 Barasat (24 Parganas)	4 2 1938 to 8-2 1938
31 Dubrajpur (Birbhum)	8-2 1938 for a week.
32 Kalna (Burdwan)	2" 2 1938 for 15 days
33 Barisal (Bakarganj)	20-2 1938
34 Jamalpur (Mymensingh)	20-2 1938
35 Chittagong	4-3-1938 for a fortnight.
36 Rayerkati (Bakarganj)	23-2 1938 for one week.
37 Comilla (Tippera)	26-2 1938 to 4-3-1938
38 Bethuadahari (Nadia)	24th February 1938

CHAPTER IX.

Technical and Industrial Education.

81 **General.**—In any scheme for industrial development a good deal of attention has to be paid to the improvement of the factors of production. Technical and technological education is admittedly one of these important factors, contributing as it does, to increase the industrial efficiency of the worker and infusing craft-mindedness in those who aspire to an industrial career. The Department endeavours to provide industrial and technical education through the media of the four Government technical schools at Pabna, Bogra, Rangpur and Barisal, a number of specialised institutions, like the Weaving Institute at Serampore, the Silk Weaving and Dyeing Institute at Berhampore, and a number of private institutions receiving Government grants-in-aid. Financial stringency in the past had its effects on the activities of the Department and did not permit expansion on a broad scale. During the year under report, however, additional funds were placed at the disposal of the Department and it was possible as a result not only to restore cuts in grants to deserving institutions but also to assist the starting of some new schools. Amongst such new institutions, the "Ideal Home" started at Chittagong by Khan Bahadur Fazlul Kadir, M L A, for imparting industrial education amongst Muslims and the Industrial School at Gaffargaon (Mymensingh) deserve special mention. Given better financial prospect further expansion of the activities of the Department in this direction will be possible.

As a measure of encouragement additional scholarships were sanctioned during the year and proposals were submitted to Government for the revival of the State technical scholarships. New rules governing the award of weaving loans were approved by Government and these were to come into force from the 1st April 1938.

With the appointment of a Textile Supervisor empowered to inspect the aided weaving schools the Inspector of Technical and Industrial Institutions was relieved of a part of the heavy duty of the inspection of aided weaving schools, some situated in out of the way places in the different districts. The Superintendent of Textile Demonstrations, Bengal, was also able as a result

of this arrangement, to devote more time in inspecting and scrutinising the work of the Government Weaving Schools.

82 **Board of Apprenticeship Training.**—One of the functions of the Board is to hold examinations in connection with apprenticeship training and during the year under review it conducted the following examinations —

- (i) Apprenticeship Admission Examination
- (ii) Annual Technical Schools Examination
- (iii) Diploma Examination for students of the Bengal Engineering College
- (iv) Associateship Examination for students of the Bengal Engineering College

The Apprenticeship Admission Examination was held twice in the year, in May 1937 and January 1938. At the May examination 125 candidates sat, of whom 25 passed. The corresponding numbers for the January examination were 126 and 29.

The Annual Technical Schools Examination was held in December. There were, in all, 440 entries for examination and the number of passes was 293 including 83 with distinction.

The Diploma Examination was held in August. Five candidates appeared and all of them passed.

The Associateship Examination also was held in August. Three candidates appeared of whom two passed.

83 **Finances of the Board.**—The following table gives information regarding the finances of the Board —

Receipts		Rs	Expenditure		Rs	a	p
Fees from examination—			Cost of examinations—				
Admission	May 1937	1 00	Admission	May 1937	1 26	7	0
Ditto	January 1938	1 12	Ditto	January 1938	1 36	2	0
Diploma		200	Diploma		1 01	10	6
Associateship		120	Associateship		7 27	16	6
Annual Technical		440	Annual Technical		904	7	0
Fee for issuing a duplicate certificate		0					
Total		3 77	Total		5 34	12	3

84 **Institutions connected with the Board of Apprenticeship Training.**—Particulars of the activities of some

of the important institutions connected with the Board are given below—

Senior Technical Schools (aided)—
 (1) *The Calcutta Technical School*—The school imparts theoretical training with laboratory practice to students apprenticed with various engineering and allied workshops in and around Calcutta. The annual Entrance Examination was held on the 26th and 27th May 1937, in which 56 candidates out of 96 registered passed and 53 took admission. Besides this two candidates who had passed the Admission Examination of the Board of Apprenticeship Training were also admitted into the School. Of those admitted 42 were already apprentices in different workshops. The session commenced as usual in July. The distribution of the students and their attendance in the different sections are given below—

(i) *Mechanical and Electrical Engineering Course*—The average number of students on the roll per month was 220. Sixteen students passed the Final Examination held in June 1937.

(ii) *The Electric Supervisors' Course*—The average number per month on the roll was 27. Seven students passed the final examination held in February 1938.

(iii) *Sanitary Engineering and Plumbing Course*—The average number of students on the roll per month was 45.

The following demonstration parties of the Department of Industries, Bengal, were accommodated in the School premises during the year 1937—

- (1) One metal casting party
- (2) One cutlery party
- (3) One weaving party

The Boot and Shoe-making and Leather Goods Manufacturing Class of the Bengal Tanning Institute continued its work in the School premises throughout the year.

(2) *Kanchiapara Technical School*—Nine apprentices completed training, one proceeded to the Bengal Engineering College for higher training and 11 resigned. Of those who resigned 5 were selected for apprenticeship elsewhere by the Federal Service Commission. Of the 9 who completed training 3 obtained appointments in the Eastern Bengal Railway.

Sixteen new apprentices were admitted to training. Forty-two candidates were sent up for the Board of Apprenticeship Training Annual Examination held in December, and the percentage of success was 68.5. The corresponding percentage for the previous year was 62.

(3) *Assam-Bengal Railway Apprentices' Technical School, Pakur*—Trade Apprentices of the Assam-Bengal Railway Workshops go through a 5-year course of apprenticeship. Each apprentice attends 4 periods of 1½ hours each or 6 hours per week.

One apprentice appeared at the Annual Examination of the Board of Apprenticeship Training held in December and was successful.

No student passed the final examination in the year under report. There were 35 apprentices on the roll at the end of the year.

(4) *Bengal-Nagpur Railway Locomotives' Technical School, Kharagpur*—This school, which generally follows the syllabus of the Board of Apprenticeship Training had on its roll apprentices varying in number from 72 to 89 during the year. In the Annual Technical Schools Examination held by the Board of Apprenticeship Training there were candidates for examination in 7 different subjects and against 89 entries in these subjects the number of passes was 53 of which 14 were with distinction.

85 Junior Technical Schools.—The course and period of instruction in these schools remained practically the same as in the previous year except that a one-year motor mechanic course was added to the Technical School at Bogra. The location and courses of instruction were as noted below—

Government Schools at—

Barisal—Artisan class (3 years)

Pabna—Artisan class (3 years), Amin class (1 year), Sub-Overseer class (2 years) and Motor Mechanic class (1 year)

Rangpur—Artisan class (3 years) and Amin class (1 year)

Bogra—Artisan class (3 years) and Motor Mechanic class (1 year)

Aided schools at—

- Rajshahi—Artisan class Amin class and Sub-Overseer class
 Burdwan—Technical class, Artisan class and Sub-Overseer class
 Faridpur—Special Technical and Artisan classes
 Krishnagar—Technical and Artisan classes
 Hooghly—Technical and Artisan classes
 Vishnupur—Technical and Artisan classes
 Mymensingh—Technical and Artisan classes
 Comilla—Technical and Artisan classes
 Khulna—Artisan class
 Ishapore—Ordinance Technical School with a special course

Further particulars of some of the above schools are given below —

(1) *Elliot-Banamali Technical School Pabna*—There were 85 students including 26 Moslems on the roll on 31st March 1937 and the average daily attendance was 82. The results of examinations of the different classes were as given below —

Class	Number of candidates	Number of passed
Sub-Overseer	23	18
Amin	13	13
Motor Mechanic	10	—
Artisan in Smithy and Carpentry	2	2

The total expenditure for running the school was Rs 17,787. Of this Rs 11,110 was met from grants from the provincial revenues and Rs 2,500 from the District Board. Fees to the extent of Rs 2,569, seat rent Rs 362 and half share of municipal taxes Rs 80 were realised from the students while the sale proceeds from workshop manufactures amounted to Rs 930.

A sum of Rs 3,214 was spent on the attached Hindu and Muhammedan hostels which had an average of 27 boarders throughout the year. As against this a sum of Rs 3,059 was realised from the boarders.

(2) *Edwards Industrial School Bonga*—This school imparts instruction in carpentry, blacksmithy and tinsmithy. A motor mechanic class

has as already stated been added in the year under report.

Out of 48 students in all the branches 16 appeared and all of them passed the final examination. Successful candidates are awarded 50 per cent of the accumulated value of the labour put in by them during the period of training.

The total expenditure incurred on account of the school amounted to Rs 13,436 including for establishment about Rs 8,148 and for stipends Rs 2,507 to which the District Board's contribution amounted to Rs 884. The receipts amounted to Rs 2,165 including Rs 1,210 from sale proceeds. Except for the District Board stipends mentioned above and about Rs 50 realised from fees and fines, the expenditure was as usual met mainly from the provincial revenues.

(3) *Government Technical School, Barisal*—This school trains artisan students in carpentry, blacksmithy and tinsmithy. Out of the total number of 63 students 19 appeared and passed the final examination.

The total expenditure amounted to Rs 12,247 including Rs 6,816 for establishment and Rs 1,922 for stipends. Rs 9,422 was met from the provincial revenues and Rs 2,625 was realised from sale-proceeds of manufactured articles.

(4) *Bayley-Gobindlal Technical School Rangpur*—There were 90 students including 39 Moslems on the roll on the 31st March 1937 and the average daily attendance was 75. The results of examinations were as given below —

Class	Number of student on the roll	Number sat at the examination	Number passed
Amin class	47	18	18
Artisan class—			
Carpentry	26	6	6
Smithy	17	—	3

The average number of pupils of the Science Side Class of the Rangpur Zilla School who attended the technical school classes in manual training and land measurement was 12.

The total expenditure for the school was Rs 18,982 including on establishment about Rs 11,600, contingencies etc Rs 4,450 and scholarships Rs 2,024 (Government) and Rs 641 (District Board). On the receipt side a sum of

Rs 12,056 came from the provincial revenues, Rs 630 from the District Board and Rs 600 was the subscription of the Raja of Tajhat. Fees and fines to the extent of Rs 1,090 and seat-rent, etc., amounting to Rs 246 were realised from the students, while the sale-proceeds of workshop manufactures amounted to Rs 1,538.

There were 23 students on an average in the attached Hindu Hostel, the Moslem students being accommodated in the Hare Moslem Hostel.

Ordinance Technical School, Ishapore.—At the commencement of the 1937-38 session there were 86 students on the roll of the school, of whom 44 were in the first year, 24 in the second year and 18 in the third year. At the close of the session there were 77 students, 36 in the first year, 23 in the second year and 18 in the third year.

All the third year students, 18 in number who completed their course in the year under report, found employment—16 in the Rifle Factory and 2 in the Inspectorate of Small Arms at Ishapore. Out of a total of 112 boys who have passed out of the school since its inception 98 are employed in the various branches of the Ordnance Department and 7 are employed with various outside firms. In addition, 22 boys who could not complete the course but were good at practical work have also found employment in suitable work in the Rifle Factory.

The total expenditure for the year came to about Rs 5,700. The Government grant awarded through the Department amounted to Rs 2,850.

86 Overseer Examination Board.—The Overseer and Sub-Overseer Examinations are controlled by this Board. The Chief Engineer, Communications and Works Department, Roads and Buildings Branch, Government of Bengal, is the President and the Inspector of Technical and Industrial Institutions, Bengal, the Secretary of the Board.

The Overseer classes are held exclusively at the Ahsanullah School of Engineering Dacca, under the Education Department, while the Sub-Overseer classes are held at the technical schools at Pabna, Rajshahi and Baidyan and at the Ahsanullah School of Engineering, Dacca.

Out of 88 candidates who sat for the Overseer Examination, 52 or 59 per cent were successful, 10 passing in the first division, 26 in the second division and 16 in the third division.

Out of 154 candidates for the Sub-Overseer Examination, 62 per cent, were successful, 32 in the higher division and 64 in the lower division.

The reports of the examiners on the answers of the Overseer and Sub-Overseer candidates were considered by the Board and ordered to be circulated to the institutions concerned.

The Board held three meetings during the year under review on the 19th April, the 7th October and the 2nd December.

The Board's recommendation, viz., that the title "Dip C E (Bengal)" should be awarded to the passed Overseers, was not accepted by Government.

The extension of the affiliation of the Pabna Technical School to the Sub-Overseer standard for three years from the 1st April 1937 was sanctioned by Government.

The receipts of examination fees from candidates amounted to Rs 6,600. The expenditure the Board incurred for conducting the examinations during the year came to Rs 4,495-8.

87 Survey Education Advisory Board.—This board controls the training of the Survey Final course as well as the Amin course. The Director of Land Records and Surveys, Bengal, is the President and the Inspector of Technical and Industrial Institutions, Bengal, the Secretary of the Board. The Board held two meetings during the year, on the 31st August and the 6th October.

The Survey Final classes are held only at the Bengal Survey School, Comilla, while the Amin classes are held at the technical schools at Pabna, Rajshahi, Rajshahi and Madhabpasa (Bakarganj) and at the Bengal Survey School, Comilla.

The Survey Final Examination was held in September 1937. Twenty students appeared and 15 were successful. The Amin Examination was held in July 1937 and 94 students out of 113 or 84 per cent were successful. Of the successful candidates 11 were placed in the first division, 23 in the second division and 60 in the third division.

The reports of the examinees on the answers of the Survey Final and Amin candidates were considered and circulated to the schools concerned. The Board recommended the renewal of affiliation up to the Amin standard for one year of the D J Industrial School Rajshahi, the Chandradwip Institution, Madhabpasa (Bakarganj) and the B G Technical School Rangpur.

The fee receipts from the candidates appearing amounted to Rs 2,195. The expenses incurred for conducting the examinations came to Rs 1,357-10.

Particulars and work of the only survey school in the Province are given below.

88 Bengal Survey School, Comilla (Tippera).—The courses of training in the school are (a) Survey Final Course (1 year) (b) Amin Course (1 year).

There are also arrangements for special classes (i) for training candidates sent by the Divisional Commissioner for appointment as District Kanungoes and (ii) for training casual students.

The average daily attendance of students was about 78.

Twenty students appeared at the Survey Final Examination held in September 1937 and 15 passed. Fifty-three students appeared at the Amin Examination held in July 1937 and 42 passed.

During the year, 11 passed students were known to have secured appointments in various capacities.

The second year students were out in camp for 3 months during the cold weather and carried out important demarcation work provided by the Collectors of Tippera and Noakhali.

The total expenditure for maintaining the school amounted to Rs 17,338 and the income from fees and other sources came up to Rs 6,434 in the year under report.

89 Mining Education Advisory Board.—This board is responsible for the development of mining education in the coal fields of Bengal.

Meetings of the Board.—The Board held two meetings: one on the 5th April 1937 and the other on the 22nd March 1938.

(1) *Evening lectures in Mining.*—In Bengal, the evening classes remained closed temporarily under orders of Government. The Board decided to make urgent representations to the Provincial Government to reopen the English section of the classes in the coal-fields of Bengal and a scheme was drawn up and submitted. It was pointed out that under existing conditions there were good prospects of employment for persons who passed through these classes and that there were not enough trained men to fill normal vacancies. The recent mining disasters in the Bengal coal-fields showed that it was necessary to have a higher standard of training for subordinates. The scheme consisted in holding training classes at two centres with the help of one full time Lecturer and an Assistant Lecturer at a total cost not exceeding Rs 10,000 per annum.

(2) *Vernacular lectures to colliery sirdars—General.*—In Bengal, a course of ten lectures was delivered in Bengali at 8 centres—Burra Dhemo, Victoria Bank Simulla, Samla Ramnagar Jamuria, Kajora, Jambad and Sodepur (Nos 9 and 10 pits). The total number who attended the course was 187 with an average attendance of 111 as against 147 and 108 respectively of the previous year.

(3) *Vernacular lectures to colliery sirdars in gas testing.*—Classes in gas testing were held for sirdars at two centres, Sitarampur and Jamuria in the Bengal coalfields towards the close of the year. The total number attending the course was 36—25 at Sitarampur and 11 at Jamuria, as against 55 (15 and 40, respectively) of the previous year.

The receipts consisted of fees for Vernacular classes (general) Rs 187 and gas testing classes Rs 36 or a total of Rs 223 while the expenditure amounted to Rs 680 of which the pay of the Vernacular Lecturers was Rs 460, menials Rs 168 and contingencies Rs 52.

90 Other industrial institutions.—I. *Government Weaving Institute Serampore.*—The courses of instruction and training remained unchanged viz,—

(1) Higher Course (3 years)

(2) Artisan Course (1 year)

(a) *Admissions*—As usual the session commenced in July. Two hundred and sixty-seven applications were received for admission into the first year class of the higher course, 59 were called for admission and 42 candidates actually joined the Institute. The total number of students in the higher classes was 103.

The year opened with 33 students on the roll in the Artisan Course and 65 more were admitted during the year. Forty-two students were under training in the Women's Section including 11 admitted during the year under report. Eighteen students of the higher course passed the Final Diploma Examination. Forty-six artisan students and nine female students passed after having undergone the necessary training. Twenty-four students passed the City and Guilds Examination in various subjects.

(b) *Loans*—Loans amounting to Rs 520 were granted to two passed students (one Higher Course and one Artisan) to enable them to purchase accessories etc. for the equipment of weaving factories. The realisation of instalments from the previous borrowers was regular excepting in the case of one ex-student against whom proceedings were being resorted to.

(c) *Library*—The grant of Rs 100 was spent in the purchase of books and for subscribing textile journals. The total number of books in the Library at the end of the year was 830.

(d) *Athletics*—The students took an active interest in both indoor and outdoor games. Almost the entire sum of Rs 100 sanctioned for the purchase of sports gear was utilised for the same purpose.

(e) *Health*—The health of the boarders was satisfactory throughout the year. There was, however, one case of chicken-pox in each of the Muhammadan and Hindu hostels, despite vaccination as usual. The Officer-in-Charge of the local Walsh Hospital looked after the health of the boarders.

(f) *Discipline*—The discipline of the Institute including the Women's Section was satisfactory throughout the year.

(g) *Expenditure*—An amount of Rs 84,233 was spent on pay of staff, contingencies, scholarships and allowances excluding Rs 19,468 spent for

handloom research under the Government of India scheme.

(h) *Receipts*—The total receipts amounts to Rs 1,070-13-9, viz., fees and fines Rs 158-2, seat rent and furniture rent Rs 649-8, occupier's share of municipal taxes, etc., Rs 263-3-9.

(i) *Extensions, etc.*—The construction of a new lecture theatre and the re-equipment of the various laboratories were completed during the year. Extension of the existing cotton weaving plant, establishment of a new jute house and a small research section attached to the Dyeing Department are in contemplation.

II *Government Silk Weaving and Dyeing Institute, Berhampore*—The Institute provided, as usual, two courses of instruction, viz.,—

- (i) the Advanced Course of two years, and
- (ii) the Artisan Course of one year only.

(a) *Session*—The session commenced in July. There were 60 applications for the Advanced Course and 52 for the Artisan Course. The actual numbers admitted were 25 and 36 in the respective courses.

(b) *Attendance*—On the last day of the year under report the number of students in the Advanced Course was 28, viz. 17 in the first year and 11 in the second year, the number in the Artisan course was 25. The average daily attendance was 14.9 in the first year and 7.7 in the second year of the Advanced Course and 21.5 in the Artisan Course.

(c) *Finance*—The total receipts from various sources amounted to Rs 537-11-3 only including sale-proceeds of manufactured cloth Rs 134-7-9 and rents and taxes Rs 236-5-6.

The expenditure amounted to Rs 22,145-3-6 including establishment Rs 13,865-7, scholarships Rs 3,452-14 and miscellaneous Rs 4,826-14-6. Net Government expenditure was Rs 21,607-8-3 and scholarships awarded by District Boards amounted to Rs 126-13.

(d) *Examinations*—City and Guilds of London Institute Examination—Twenty-seven candidates were sent up from the Institute and the percentage of success was about 59.

Diploma Examination—Seven students completed the Advanced Course and 6 passed the final examination held in July 1937

Artisan Course Examination—The annual examination of the Artisan Course was held in July 1937 and 13 students were given certificates on the results of the examination

III District Weaving Schools—These schools impart instruction in simple handloom weaving and dyeing, free of any charge. The course of study extends over one year only. The number of students admitted for each course is limited to 20, and each student is awarded a Government stipend of Rs 4 per mensem

The schools are maintained jointly by the respective District Boards and the Department of Industries Bengal. There were nine such schools, viz., at Malda Sui (Birbhum), Pabna Bankura, Tangail (Mymensingh), Beganganj (Noakhali), Zorwanganj (Chittagong), Khulna and Dacca. The school at the last named place is on a bigger scale than the others

Appendix II shows in detail the activities of these schools

IV Peripatetic Weaving Schools—These schools impart a short course of instruction free of any charge in handloom weaving for 4 months only to the boys of weavers and others in their homes in the interior villages of Bengal. Each student is awarded a Government stipend of Rs 4 per month during the training period. There were 26 such schools under the control of the Department in the year under report. The District Boards contribute, as usual, to the cost of maintenance of these schools

Appendix III shows in detail the activities of these schools

V Aided weaving or other industrial schools—The number of such schools was 91 of which 25 were for girls. A number of crafts are taught in these schools such as carpentry, weaving, sewing, tailoring, cane and bamboo work, lace making, chutney-making, etc. some with conspicuous success

91 Weaving loans to passed students—Weaving loans bearing interest at the rate of 6½ per cent per annum repayable in 24 equal monthly instalments are granted to passed students of

the weaving schools who intend to start weaving establishments

During the year a sum of Rs 3,588 out of the allotment of Rs 4,000, was granted by way of weaving loans to 46 students of the weaving schools under this department, including the Government weaving Institute, Serampore

92 Grants-in-aid.—During the year a sum of Rs 1,94,719 was awarded as renewal of annual maintenance grants-in-aid to 91 technical, industrial and weaving schools including restoration to some of them, as funds permitted, of the 12 per cent cut previously imposed

Building, furniture and equipment grants amounting to Rs 8,000 were also awarded to 17 schools

93 Scholarships.—The grant under this head was spent in awarding stipends at rates varying from Rs 4 to Rs 15 to certain students of 42 Government technical, industrial and weaving schools in Bengal under the control of this department. Four scholarships of the value of Rs 25 each per month were also awarded to the Bengal students of each of the first, second and third year classes of the Indian School of Mines, Dhanbad, under the control of the Government of India

A number of special stipends at rates varying from Rs 3 to Rs 8 per month was awarded to poor students of certain Government and aided technical schools and a few special scholarships at rates varying from Rs 12 to Rs 25 were awarded to passed students of some technical schools for higher training at the Bengal Engineering College, Sibpur and the Ahsanullah School of Engineering, Dacca. Two special scholarships of the value of Rs 40 each per month were awarded for training in sugar technology to two Bengal students of each of the first and second year classes of the Imperial Institute of Sugar Technology, Cawnpore

94 City and Guilds of London Examination Committee, Bengal—The City and Guilds of London Institute Examinations were held in April-May 1937 at 5 centres, viz. Calcutta, Dacca, Serampore, Berhampore and Berhampore Detention Camp. The conduct of these examinations is controlled by a non-official committee of which the

Director of Industries is the Chairman and the Inspector of Technical and Industrial Institutions, the Secretary. Out of 254 candidates registered 217 appeared and 109 passed in different subjects. The income from fees realised from candidates came up to Rs 2,504 and the total expenditure incurred during the year amounted to Rs 2,029. No demand was made on public revenues for the purpose of conducting these examinations.

96 **Civil works budget.**—The grant at the disposal of the Director of Industries in the Provincial Civil Works budget for 1937-38 for minor works was Rs 12,000. The actual expenditure during the year was Rs 11,385 only.

CHAPTER X.

Finance.

95 **Industries Budget.**—The original sanctioned grant for 1937-38 was Rs 11,82,300 as per details noted below—

A—Industries	Rs
D—Works	11,76,100
E—Charges in England	6,000
	200
Total	11,82,300

Separate Government of India grant for the economic development and improvement of rural areas (for spinning and weaving parties)

The actual receipts and disbursements during the year are shown below—

VXXI—INDUSTRIES

(Receipts)	Rs
Receipts from Industrial operation including	
Rs 9,761 from Sericulture	73,127
43—INDUSTRIES	
(Expenditure)	

A—Industries—	
(1) Direction (Voted)	
Ditto (Charged)	
(2) Industrial development including Bengal Tanning Institute, Sericulture and Dotenu Training Scheme	1,24,565
(3) Industrial education—	5,153
(a) Technical and industrial schools	4,04,080
(b) Inspection	2,31,114
(c) Scholarships	16,796
(d) Grants in aid	41,713
(4) Miscellaneous (Voted)	2,23,694
Ditto (Charged)	13,162
(5) Government of India Scheme—	761
(a) Development of sericultural industry	42,164
(b) Development of handloom industry	30,182
(c) Grants in aid	2,400
D—Works	11,35,784
III Charges in England	12,351
	480
Total Industries	11,48,615
Deposit account of grant for the economic development and improvement of rural areas	12,486

CHAPTER XI.

General.

97 **Encouragement of industries by securing special concessions as well as by technical assistance and advice.**—

(a) *Acquisition of land for industrial purposes under the Land Acquisition Act*—Eight applications from Messrs The Indian Iron & Steel Co., Ltd., Hinapuri, Burdwan, were forwarded by Government during the year under report for an expression of the Department's opinion on the advisability of the application of the Land Acquisition Act for acquiring lands on behalf of the firm. The total area covered by the proposals amounted to 418.16 acres and was needed mainly for the extension of the firm's existing steel works. Excepting one case which was under enquiry when the year closed, all the other applications were supported by this department on the ground that the establishment or extension of a modern steel factory was a development of considerable value to the industrial growth of the country.

The proposal for the acquisition of land measuring 8.86 acres in village Barakali, district Burdwan, on behalf of Messrs The Eastern Light Casting Co., Kulti, in respect of which a notification under section 4 of the Land Acquisition Act, No 10106-L A, dated the 30th April 1937 was published, was not proceeded with. As a result of intervention by this department it was subsequently found possible for the firm to acquire the land by private treaty.

The application of Messrs Bata Shoe Company, Ltd., Batanagar, 24-Parganas, for acquisition of 169.65 acres of land in village Nangi, Bangla, district 24-Parganas, for extension of their existing factory was recommended by this department.

(b) *Tramway project of the North Bengal Sugar Mills Co., Ltd. Gopalpur, Rajshahi*—The proposal of the firm for the acquisition of land for constructing a tramway line of 2' 6" gauge for a length of approximately 15 miles was strongly supported by the Department as calculated to open up the areas for sugarcane cultivation by facilitating transport of the cane to the mills consuming it. On account of high transport charges by bullock carts the cultivators in this area cannot take advantage of this cash crop cultivation. A notification under section 4 of the Land Acquisition Act authorising the engineer of the sugar mills concerned to survey the alignment proposed for the tram line was published in the *Calcutta Gazette* of the 14th October 1937.

(c) *Free testing*—The Tropic Sensitising Corporation P-452 Rashbehari Avenue Calcutta the only firm manufacturing sensitised paper locally for the photographic industry and for that purpose helped with a loan of Rs 5 000 under the Bengal State Aid to Industries Act for developing its business was recommended to have the samples of sensitised papers manufactured by it tested free of charge at the Government Test House Alipore in connection with the registration of the name of the firm as approved contractors to the Indian Stores Department.

(d) *Testing facilities* were also arranged for with the help of the authorities of the All-India Institute of Hygiene and the School of Tropical Medicine in the cases of certain antiseptic preparations made by enterprising private parties.

(e) *Certificate of origin*—Certain manufactures in Bengal exporting goods to ports outside British India were granted certificates of origin of the consignments despatched in order to enable the exporters to avail of the rebate on the import duty or a lower rate of duty payable at the port of entry.

(f) *Proposal for reduction of import duty on silk reeling machines*—The development of the indigenous silk industry is dependant on the production of yarn of approved standard possible only with the use of modern silk reeling machines suitable for reeling concerns both large and small.

The import duty on the hand operated silk reeling machine is 30 per cent *ad valorem* and this high duty stands in the way of the wide introduction of the machines. Government have accordingly been moved for a reduction of the duty to 10 per cent *ad valorem*.

98 **Protection to small scale and minor industries in India against Japanese competition.**—A number of minor industries were in the earlier part of the year under report facing badly against Japanese competition and as a result of action by the Government of India, the Department, at the request of the Provincial Governments submitted a comprehensive report explaining the nature and extent of competition from which the indigenous industries of the Province were suffering together with suggestions of the form of relief needed. The enquiry by the Government of India was later on suspended in view of the unsettled conditions in the Far East causing rise in the price of the Japanese imports into India.

99 **Tariff Board enquiry into the sugar industry.**—At the request of the Tariff Board the Director of Industries met the members of the Board on the 19th April 1937 and took part in an informal discussion. Subsequently written answers to the questionnaire issued by the Board were furnished and later on the Director of Industries, as one of the representatives of the Provincial Government was orally examined by the Board on the 21st September 1937 and his oral evidence was supplemented by a memorandum dealing with certain important aspects of the industry. Particulars regarding the retail prices of *sugar* and *jaggery* during the recent years as also a list of sugar mills working in the Province with their location and daily cane crushing capacity were also furnished to the Board on request.

100 **Declaration of the quarrying of limestone as a major mineral industry.**—The proposal mooted by the Board of Revenue Madras for the declaration of limestone quarrying as a major industry was supported by this department. It was however not in favour of any increase in the rate of royalty as the same was likely

to increase the cost of the material and thereby defeat the object in view, viz, the development of indigenous industries dependant on the use of limestone

for ascertaining in connection with their classification for freight whether the materials were used in the tanning industry. The samples were examined with the help of the Superintendent, Bengal Tanning Institute, and it was found that they were not used in tanning. The railway authorities were informed accordingly.

101 Proposed amplification of the accounts relating to inland (rail and river-borne) trade of India.—In reply to the reference received from the Director-General of Commercial Intelligence and Statistics, India, on the subject referred to above, it was pointed out that the existing monthly accounts which restrict themselves to a small number of articles, are not very helpful. A revised and enlarged list of commodities and revision to the original system of registration of trade blocks were recommended for adoption in the amplified accounts. The desirability of adopting some means for the registration and inclusion of figures of the rapidly developing road-borne trade in the monthly accounts was also pointed out as without the same the accounts were not expected to reveal the actual position in regard to the inland trade of India.

102 Proposed legislation for the registration of trade marks in India.—In reply to the communication received in the Department for an expression of its views on the proposal of the Government of India, Commerce Department, regarding the above legislation, the Department supported the proposal after proper examination and generally agreed to the draft outlines of the proposed legislation.

103 Classification of boilers in the sea-borne trade returns of British India.—In connection with the proposal of the Director-General of Commercial Intelligence and Statistics for proper classification of "boilers" for the purpose of sea-borne trade return of British India, it was explained to that officer that boilers were quite distinct from engines, locomotives or prime movers and as such they should be classified as "boilers" only and not under the prime movers or locomotives.

104 Classification of railway freight tanning materials for railway purposes.—Samples of certain vegetable bodies were forwarded by the authorities of the Eastern Bengal Railway

105 Unemployment among intellectuals.—The proposal of the League of Nations recommending among others the (i) collection of the most comprehensive data possible on the state of unemployment amongst intellectuals together with opportunities of their employment and (ii) constitution for the purpose of a University Information and Intelligence Bureau. In reply it was pointed out that the Department was directly concerned with technical and industrial education of an elementary character which was an enquiry in view of the statistical outside the scope of the department in the institutions under this also explained that of the students trained in the goods many were either employed or engaged in the professions they learnt and that the question of unemployment was not yet very acute among them.

106 Annual holidays with pay to labour employed in various establishments.—At the request of the Provincial Government this department submitted its views on the above matter. While it was in favour of the principle of granting annual holidays with pay it was of opinion that the application of all the provisions of the "Pay Convention, 1936" to all the undertakings or establishments enumerated in Article I of the Convention was not a practical proposition. The Department, however, thought that the necessary legislation should be undertaken by the Central Government.

107 Regulation of workshops.—A reference was received in the Department for the expression of its opinion on the proposal of the Government of India, Department of Industries and Labour, for the extension of regulations concerning the employment of children to industrial establishments or workshops not using power and not falling within the scope of the Factories Act. The Department was in

favour of central legislation for the exclusion of children under 12 from offensive, dangerous and objectionable industries irrespective of the number of persons employed in such workshops. It also thought that the offensive industries should be specified and also that some provision be made for certification of age of children in doubtful cases. The Department was however, not in favour of the inspection work being entrusted to part-time officers as proposed and suggested that the same might be performed by well paid whole-time experienced officers of a status likely to command respect of the workshop owners.

108 Unregulated small power factories.—A similar reference was received in regard to the employment of child labour in power driven factories not coming on account of their smallness, within the operations of the Factories Act. The Department strongly supported the proposal which was intended to prevent the exposure of children to the risk of exploitation and their employment under unhealthy and dangerous conditions.

109 Meetings and conferences.—*(a) Industrial Research Council.*—The third session of the Industrial Research Council was held at Bombay on the 5th and 6th July 1937 and the Director of Industries as an official member attended the meeting.

(b) Ninth Industries Conference.—The above conference of the provincial Directors of Industries was convened by the Government of India on the 15th and 16th December 1937 at Lahore. The Secretary to the Government of Bengal in the Agriculture and Industries Department and the Deputy Director of Sericulture, Bengal represented the Provincial Government in the conference.

(c) Fourth Imperial Sericultural Conference.—The fourth meeting of the Imperial Sericultural Committee which followed the 9th Industries Conference was held at Lahore on the 17th December 1937. The Director of Industries as an official member attended the meeting along with the Deputy Director of Sericulture, Bengal. The proposals made by the Government of Bengal for working the existing schemes on a modified basis as also for introducing fresh research

schemes for investigation into the diseases of mulberry and silkworms during 1938-39 were accepted in toto. Bengal's share in the total allotments for 1938-39 came up to Rs 50,000 approximately.

(d) Excise Conference.—Arising out of the Eighth Industries Conference held at Lucknow the Government of India convened a conference of Commissioners of Excise of different provinces and certain selected Directors of Industries with a view to evolve a uniform set of rules to govern the movements of medicinal preparations containing alcohol between the provinces. The conference was held on the 8th November 1937 at New Delhi and for unavoidable reasons the Director of Industries could not attend. The Commissioner of Excise and Salt, Bengal, however, attended the conference.

110 Board of Economic Enquiry, Bengal.—There was no meeting of the Board during the year under review. The final report of the Board on the survey of the handloom weaving industry of Bengal, undertaken and completed in the previous year, is still awaited. At the request of the Board, this department has suggested for enquiry by the board two fresh subjects of economic importance to the Province and has also indicated the lines on which the enquiry should be made.

111 Board of Industries, Bengal.—There was no change in the membership of the Board except that Mr A R Siddiqi, M L A, was appointed to be a member of the Board in Government notification No 6400-Ind, dated the 9th September 1937, vice Mr N Rajabally resigned. Di Sir U N Brahmachari, Kt and H R Norton Esq, M L A continued to be respectively the Chairman and Vice-Chairman of the Board throughout the year.

The Board held 10 meetings during the year under report. The number of formal applications for State aid received by the Board during the year was 28 as against 42 in the previous year of which 21 were pending at the close of that year. Altogether 8 applications including 4 pending from the previous year were either withdrawn or abandoned during the year under report. In the statement

given below it will be seen that the total number of applications considered by the Board in 1937-38 was 31 which included 17 pending from the previous year. Of these 31 applications 18 (including 11 of the previous year) were recommended for sanction of Government, 10 (including 6 of the previous year) for rejection by Government and 3 kept pending for further consideration along with 10 others still under enquiry—

	Total number	Re-com-mended for sanction	Re-com-mended for rejection	With drawn	Pend-ing
1 Applications from last year pending	21	11	6	4	
2 Applications during 1937-38 received	28	7	4	4	11
	40	18	10	8	15

A total sum of Rs 20,250 was actually disbursed as loan under the Bengal State Aid to Industries Act, 1931 during the year under review as against Rs 40,075 in the previous year. Of the aforesaid amount a sum of Rs 2,500 was drawn from the allotment made by Government in the loans budget for the year under report and the balance was met from the Board's own funds. The recovery on account of repayment of loans advanced amounted to Rs 5,699-14 and Rs 2,636-4 on account of principal and interest respectively and was creditable to the Board's fund.

The total expenditure for the working of the Board amounted to Rs 3,130-6-6 (including pay of staff, fees to members, advertisement charges, etc.) as against Rs 2,576 in 1936-37 and was met out of the funds provided by Government in the Industries Budget for the purpose.

A detailed account of the working of the Board will be found in the Board's annual report which is published separately.

As a result of adaptation by the Government of India of the existing Indian laws with a view to bringing them in conformity with the Government of India Act introduced from the first April 1937, the power delegated by the Provincial Government to the Board to dispose of applications up to Rs 5,000 in any one case was withdrawn in Government notification No 224-T—A.I., dated the 8th May 1937.

The Provincial Government on the representation of the Board and in supersession of previous orders on the subject authorised the Board to use discretion in the matter of inviting by public advertisement objections to the grant of applications up to Rs 3,000.

112 Library.—During the year under review the library attached to the Department continued to grow in usefulness and popularity. Among the visitors were industrialists, businessmen, professors, students and persons interested in technical questions. The number of persons using the library was larger than even before. This increase in popularity was presumably due to removal of the library to a more easily accessible locality in the neighbourhood of Dalhousie Square.

During the year 128 copies of the latest standard publications on science, industry and commerce, excluding Government publications were obtained and this raised the total number of books in the library to 6,368. In addition, a number of technical and scientific journals, both Indian and foreign, were subscribed.

The position at the end of the year in regard to the literature stocked was as given below—

Literature	Total number	
	1936-37	1937-38
1 Books (technical and others)	6,240	6,368
2 Journals subscribed—		
(i) Indian	19	28
(ii) British	13	13
(iii) American	6	6

The library being essentially of a technical nature, the necessity of organising it on modern methods had been making itself felt for some time past. Accordingly one of the assistants of this office, who does the library work, was deputed to undergo the training afforded by the All-Bengal Library Association, which training he has since completed.

113 Publications.—The following bulletins were published during the year 1937-38—

(1) Bulletin No 74—Grading of Hides and Skins and Development of the Hides and Skins Industry in India.

(2) Bulletin No 75—Cotton Mill Industry in Bengal

(3) Bulletin No 9 (Revised Edition)—Improved Looms and Appliances for the Handloom Weaving Industry in Bengal

114 **Tours.**—The Director of Industries, Bengal, visited Darjeeling Bombay Dacca Narayanganj, Dum Dum, Malda, Lahore, Bankura, Bhadrul, Chatna, Serampore (twice) Santipur Burdwan, Suri, Faridpur, Midnapur and Kurseong

The Deputy Director of Industries visited Agarpara, Bankura, Bolpur, Naravanganj, Dacca, Brahmanbaria, Canning Serampore, Suri, Ushagram, Dehri-on-Sone, Banjari-Kalyanpur and Dhanbad

The Industrial Chemist visited Chaumuhani, Feni, Chittagong, Noagaon Nilphamari and Bagerhat

The Personal Assistant to the Director of Industries visited Berhampore, Salbani Bankura Maslandpur, Naravanganj Dacca Bolpur, Lahore Rajshahi, Bogra, Comilla, Ushagram, Dehri-on-Sone Kalvanpur, Dhanbad Kurseong and Malda

The Inspector of Technical and Industrial Institutions visited Serampore Kurseong, Darjeeling (twice) Kalimpong Guellekhola Jalpaiguri, Cossipore, Baranagore Dacca, Kishoreganj, Gafforgaon Behala Mymensingh, Gouripore, Jhari Jhanjail, Brahmanbaria, Singhani Nandina Suri, Santhia Bolpur Nalhati Mollarpur Raniganj Pabna, Rajshahi Keorapukur Baikantapur,

Lakshmikantapur, Karanjali, Thakurpukur. Berhampore Malda Sarisha, Ichhapur Morapai Rangpur Bogra, Bhimpur Kharagpur and Midnapur

The Superintendent of Textile Demonstrations visited Serampore Karanjali, Jessore, Muchia, Anail Malda, Daulatpur Khulna (thrice) Barisal, Harinafulia Patuakhali, Madaripur, Chandra, Ulpur, Gupagram Chowmohani Lanchari Bagnan Kolaghat, Panchkura, Tamluk Chuadanga, Mohespur, Aoutpur Rajbalhat, Prodhutnagar Sripur Naravanganj, Barisal Uzirpore, Madhabpasa Mathberia, Bagerhat Balurghat Taherpur Rangpur Bhangabari, Kurigram Santalpur Jalpaiguri, Chittagong Hativa, Harishpur Zorwariganj Baravadhalya, Kotchandpur, Masundi Jagatballavpur Jiaganj and Murshidabad

The Marketing and Publicity Officer visited Bogra Serampore Belur, Ghurni (Krishnagar), Ranaghat (thrice), Dacca (thrice) Naravanganj (twice) Feni Chittagong Comilla, Chandpur Dum Dum, Burdwan (thrice) Surul Khagra Bazar (Berhampur) Belmurriat, Bankura Kalimpong, Lahore (twice), Lucknow Patna Diamond Harbour (twice), Faridpur Midnapur (twice) Berhampore Rangpur Habra Barasat Krishnagar Suri (twice) and Khardaha.

115 **Acknowledgment.**—In conclusion I should like to place on record my appreciation of the loyal co-operation which every individual member of my staff ungrudgingly extended to me during the year under review

APPENDIX I.

Abstract statistics of employment in cotton mills in Bengal (Average of 17 mills)

Department	Number of employees	Bengalee	Non-Bengalee	Vacancies annually	Remarks
Officers and Assistants	36	28	8	Un certain	Except in the Engineering Department no standard of academic qualification is laid down. Academic qualification of the existing staff range from nil to M.A., and M.Sc., degrees. As a rule one can start at the lowest ladder and walk one self up to the higher grades by dint of industry, stamina and enterprise. In the Engineering Section generally recognised Engineering qualifications are required to start with. Regarding annual vacancies figures indicate only the minimum. In actual practice more vacancies do occur.
Weaving Department	10,894	7,211	3,683	1,089	
Dyeing Department	300	156	144	15	
Spinning Department	5,351	2,324	3,027	471	
Engineering Department	1,095	734	361	88	
General establishment	904	413	491	36	
Apprentice	1,101	1,093	8	55	
	19,681	11,959	7,722	1,754	

Statistics of employment in Bengal Cotton Mills (Average of 17 cotton mills)

Department	Designation	Number of employment	Bengalee	Non Bengalee	Rate of salary or wages per month.	Qualifications required	Vacancies annually
1	2	3	4	5	6	7	8
Weaving Department	Manager	17	12	5	Rs 96 to 800	Practical experience	Nil*
	Assistant Manager	1		1	100	Ditto	
	Secretary	1		1	300	Ditto	
	Other Officers	1		1	100 to 1,000	Ditto	
	Assistants	17	16	8	103 to 400	Ditto	
	Weaving Master	36	28	2	30 to 300	Ditto	
	Assistant Weaving Master	11	5	2	12 30 to 60	Ditto	
	Supervisors	28	24	7	50 to 80	Ditto	
	Head Jobber	12	10	93	20 to 125	Ditto	1
	Jobber	10	3	45	15 to 25	Ditto	
	Sub-Jobber	271	178	2,009	12-8 to 45	Ditto	1
	Overlooker	28	26	10	22 to 50	Ditto	8
	Weavers	6	8	21	10 to 60	Ditto	2
	Sub-weavers	6,502	4,403	1	20 to 30	Ditto	650‡
	Nuxaman	250	250	11	5 to 32	Ditto	30
	Fitter	18	10		13 to 15	Ditto	1
	Winding Master	38	15				
	Supervisor Clerk.	10	9				
	Winders	1,850	1,071				
	Winding Jobber and Mistry	25	14				

*Qualifications required cannot be assessed. Most of the employees have no qualifications other than practical experience in the line.
 †As a matter of fact even some of the Managers Weaving Masters and Spinning Masters possess very little or no academic qualifications.
 ‡Some of the mills have very recently commenced work. So their vacancies could not be ascertained.

Department	Designation.	Number of employment	Bengalee	Non Bengalee	Rate of salary or wages per month.	Qualifications required	Vacancies annually
1	2	3	4	5	6	7	8
					Rs.		
	Warpers	202	149	53	12 to 40	Practical experience	21
	Drawing and Reaching Mistry	10	5	5	33 to 60	Ditto	
	Drawers and Reachers	306	208	98	15 to 30	Ditto	35
	Sizing Master, Assistant Supervisor	6	6		30 to 50	Ditto	
	Sizers and Back Sizers	169	106	63	17 to 70	Ditto	8
	Sizers and cooly	67	18	49	9 to 17	Ditto	3
	Overseers	1	1		70	Ditto	
	Finishing Jobber and Clerks	32	26	6	25 to 35	Ditto	1
	Checker and Sorter	130	94	36	14 to 35	Ditto	
	Callenderman, Baller and other	117	58	59	19 to 60	Ditto	8
	Warehouse Workers	279	218	61	10 to 25	Ditto	22
	Folders Balers and others	198	152	46	13 to 43	Ditto	11
	Sardar	3		3	14 to 45-8	Ditto	
	Coolies	121	28	93	12 to 23	NH	2
	Ollman	12	5	7	10 to 14	Practical experience	NH
	Carpenter	18	12	6	15 to 45	Ditto	NH
	Coolies	151	96	55	11 to 18	NH	18
	Cobbler	19	5	14	14 to 23	Practical experience	NH
Spinning Department.	Spinning Master	7	4	3	125 to 400	Ditto	NH
	Assistant Spinning Master	13	13		25 to 150	Ditto	1
	Overlooker	4	4		30 to 56	Ditto	NH
	Jobber	77	20	57	24 to 70	Ditto	NH
	Tenter	586	106	480	11-8 to 28	Ditto	20
	Doffer	292	99	193	10 to 18	Ditto	30
	Inter	94	36	58	15 to 33	Ditto	2
	Reeler	273	101	172	8 to 22	Ditto	16
	Head Jobber	2	1	1	55 to 60	Ditto	NH
	Roving	49	44	5	17 to 34	Ditto	5
	Galtor	100	95	5	12 to 16	Ditto	8
	Drawer	162	81	81	10 to 15	Ditto	2
	Reeler and coolies	366	21	345	11 to 16	Ditto	45
	Other workers	549	219	330	7 to 30	Ditto	56
	Sardar	5	NH	5	19 to 65	Ditto	NH
	Coolies	379	66	313	10 to 18 to 20	NH	35
	Hosery Winder	89	89		10 to 22	Practical experience	4
	Head Cards Mistry	1		1	170	Ditto	NH
	Fitter	42	33	9	15 to 120	Ditto	NH
	Mistry	143	54	89	14 to 75	Ditto	13
	Carpenter	25	9	16	7 8 to 32	Ditto	NH
	Doffer, Piers and coolies	1,910	1 062	848	12-8 to 17	Ditto	220
	Blower	73	65	8	10 to 18	Ditto	5
	Carding	110	102	8	9 to 35	Ditto	9
Dyeing Department.	Dyeing Master	8	5	3	30 to 300	Ditto	NH
	Dyeing Assistant	11	11		20 to 100	Ditto	NH
	Jobber and Mistry	9	7	2	17 to 60	Ditto	NH
	Dyers	81	13	68	12 to 20	Ditto	NH
	Dyeing coolies	191	120	71	8 to 18	Ditto	15
Engineering Department.	Engineer	17	17		40 to 60 150 to 250	Engineering qualifications or boiler certificate	NH
	Assistant Engineer	19	19		50 to 100	Engineering qualifications or practical experience	NH
	Tindal	9		2	20 to 45	Practical experience	NH
	Fitter	60	43	22	15 to 40	Ditto	9
	Fitter and Mistry	214	101	113	9 12 to 85	Ditto	16
	Watchboard man and motor	32	22	10	10 to 70	Ditto	2
	Assistant						

Department	Designation	Number of employment	Bengalee	Non Bengalee	Rate of salary or wages per month.	Qualifications required.	Vacancies annually
1	2	3	4	5	6	7	8
General Estab- lishment					Rs		
	Overseer	2	2		33 and 60	Diploma holder	NH
	Head Mistry	5	5		48 to 150	Practical experience	NH
	Turnman	16	16		20 to 50	Ditto	NH
	Oller	70	45	25	10 to 25	Ditto	10
	Overlooker	1	1		25	Ditto	NH
	Carpenter	60	60	6	14 to 40	Ditto	6
	Coolies	232	102	130	11 to 25	NH	29
	Other workers	347	244	103	13 to 55	Practical experience	16
	Departmental clerk in charge	5	5		80 to 150	Ditto	NH
	Doctor	12	12		30 to 125	Medical qualifications	NH
	Compounder	4	4		20 to 40	Ditto	NH
	Motor Driver, Launch Driver, Serang	13	8	5	40 to 70	Driving licence	NH
	Clerks	308	281	27	10, 20 75 to 150	Knowledge of clerical job with suitable academic qualifications	6
	Jamadar and Durwans	307	2	305	12, 18, 22 to 35	NH	21
	Coolies	94	49	45	7-8 to 12	NH	NH
	Sweeper and methons	128	27	101	8 to 17	NH	7
	Peons	31	23	8	13 to 19	NH	2
	Overseer and Sub-overseer	2	2		35 to 65	Diploma holder	NH
	Apprentice or Learners	1 082	1 074	8	Unpaid	Literates preferred	55
	Apprentice	19	19		15 to 25	Literates	NH
		10 631	11,059	7,722			1,764

APPENDIX II

Statement showing details relating to work of each of the nine District Weaving Schools under the Department of Industries, Bengal, up to March 1938

Location of the school.	Date of establishment.	Number of students admitted up to March 1937 since establishment.	Number of students admitted from 1st April 1937 to 31st March 1938	Number of students passed up to March 1937 since establishment.	Number of students passed from 1st April 1937 to 31st March 1938	Number of students who adopted weaving profession up to March 1937 since establishment.	Number of students who adopted weaving profession from 1st April 1937 to 31st March 1938	Number of loys and other improved weaving appliances introduced up to March 1937 since establishment	Number of loys and other improved weaving appliances introduced from 1st April 1937 to 31st March 1938
1	2	3	4	5	6	7	8	9	10
1. Bankura	1st April 1911	632	20	437	18	451	17	463	20
2. Malda	19th April 1914	569	22	411	16	266	12	354	7
3. Pabna	1915	590	20	443	20	452	17	474	17
4. Tangail (Mymensingh)	1st September 1917	493	28	330	20	214	17	307	17
5. Begamganj (Noakhali)	17th July 1920	360	22	331	21	197	21	157	25
6. Suri (Birbhum)	7th June 1926	204	23	164	19	122	16	142	
7. Zorwariganj (Chittagong)	March 1921	719	20	255	19	154	11	436	14
8. Khulna	1st November 1936	234	23	187	20	152	15	154	12
9. Dacca	1st June 1929	221	28	124	20	69	6	310	34

APPENDIX III

Statement showing details relating to the work of the 26 Peripatetic Weaving Schools under the Department of Industries, Bengal, up to March 1938

Name of school.	Date of establishment	Number of students admitted up to March 1937 since establishment	Number of students admitted from 1st April 1937 to 31st March 1938	Number of students passed up to March 1937 since establishment	Number of students passed from 1st April 1937 to 31st March 1938	Number of students who adopted weaving profession up to March 1937 since establishment	Number of students who adopted weaving profession from 1st April 1937 to 31st March 1938	Number of centres served up to March 1937 since establishment	Number of centres served from 1st April 1937 to 31st March 1938	Number of boys and other improved weaving appliances introduced up to March 1937 since establishment.	Number of boys and other improved weaving appliances introduced from 1st April 1937 to 31st March 1938
1	2	3	4	5	6	7	8	9	10	11	12
1 Harishpore (Nakhal)	December, 1927	414	30	388	20	287	11	12	2	429	1
2. Halwaghat (Mymensingh)	20th January, 1927	418	30	391	20	292	20	10	2	319	20
3 Nandina (Mymensingh)	1st January, 1919	623	30	592	30	583	15	15	1	562	30
4 Araldanga (Malda)	16th October 1920	577	30	535	28	439	28	13	1	693	34
5 Patgram (Dacca)	1st August 1919	815	20	790	28	802	20	17	1	769	27
6 Mandaldaha (Bankura)	22nd October 1926	430	20	420	30	378	24	8	1	469	23
7 Salboni (Bankura)	13th May 1919	633	30	599	30	610	29	13	1	347	30
8 Jhantipahati (Bankura)	September 1926	437	30	426	29	351	19	6	1	424	19
9 Santhia (Pabna)	January, 1927	400	40	366	30	324	23	5	1	373	36
10 Porjona (Pabna)	1st April, 1919	679	30	675	20	629	20	12	2	1124	29
11 Salathia (Birbhum)	26th April, 1922	520	30	594	30	444	30	7	1	459	40
12. Adda (Birbhum)	18th September 1926	417	21	372	21	361	20	9	2	415	20
13. Jalpaiguri	1st February 1927	430	30	416	28	404	23	6	1	366	23
14. Saxon alpur (Jalpaiguri)	10th November, 1923	294	20	256	14	227	3	6	1	247	9
15. Masundi (Burdwan)	December 1926.	429	30	411	29	334	29	6	1	351	27
16. Pantra (Howrah)	1st February 1927	366	23	357	22	222	19	8	2	211	19
17. Salboni (Majumapore)	1st December 1926	464	30	464	30	395	27	6	2	418	30
18. Kusia (Nadia)	1st May 1919	735	30	724	30	649	30	15	1	727	18
19. Matlaria (Bakarganj)	1st January 1927	363	30	383	30	264	29	10	1	453	31
20. Harinafolla (Bakarganj)	January 1927	424	30	410	29	323	21	7	1	637	25
21. Faridpur	20th January 1927	405	20	363	19	283	16	8	1	335	64
22. Digha (Dinajpur)	February 1927	400	30	376	27	293	25	7	1	324	23
23. Patana (Dinajpur)	26th December 1926	368	30	334	29	296	23	10	1	403	27
24. Patana (Dinajpur)	26th December 1926	400	30	394	30	263	23	7	2	220	31
25. Masudi (Dinajpur)	10th April 1926	350	30	390	30	272	10	5	2	453	20
26. Atan Masudi	August 1926	20	20	19	20	18	20	2	1	10	90

APPENDIX IV.

Statement showing classification of students in technical and industrial schools under the Department of Industries, Bengal, according to race and creed on the 31st March 1938

Name of schools or institutions 1	Hindu 2	Muslim 3	Christian 4	Scheduled caste 5	Others 6	Total 7	Remarks 8
Government Weaving Schools—							
1 Dacca	15	14	Nil	Nil	Nil	29	
2 Pabna	4	14		3		21	
3 Malda	5	14				19	
4 Tangail	18	14				32	
5 Khulna	3	9		7	1	20	
6 Bankura	15	3		2		20	
7 Suri	12	6		1	1	20	
8 Beganganj	4	13		6		23	
9 Zorwanganj (Chittagong)	29	22			4	55	
Peripatetic Weaving Schools—							
10 Jhantipahari (Bankura)				Santals		48	
11 Salbani (Bankura)	15			15		30	
12 Mandaldiha (Bankura)	1			29		30	
13 Mathbaria (Bakarganj)	5	22		3		30	
14 Harinfulia (Bakarganj)	6	22		1		29	
15 Sainthia (Birbhum)	16	3		3	8	30	
16 Adda (Birbhum)	1			2	17	20	
17 Masundi (Burdwan)	22	2		16		40	
18 Balurghat (Dinajpur)	14	7		8	1	30	
19 Raiganj (Dinajpur)	1	15		14		30	
20 Faridpore	4	10		5		19	
21 Bantra (Howrah)	16			12		28	
22 Jalpaiguri	28	2				30	
23 Saontalpur (Jalpaiguri)			12*	2		14	*(Santhal Chris- tian)
24 Aradanga (Malda)	4	24				28	
25 Salboni (Midnapore)	4			26		30	
26 Jীগanj (Murshidabad)	14	8		5		27	
27 Nandina (Mymensingh)	10	20				30	
28 Haluaghat (Mymensingh)	4	11	10	5		30	
29 Kushtia (Nadia)	12	23				40	
30 Harishpore (Noakhali)	2	16		2	10	30	
31 Porjona (Pabna)	2	18				20	
32 Santhia, (Pabna)	8	31		1		40	
33 Mala (24 Parganas)	1						
34 Patgram (Dacca)	5	19	4			28	
35 Anail (Malda)		5	1	34		40	
36 Government Weaving Ins- titute, Serampore, Hooghly—							
Higher Class	85	16		2		103	
Artisan Class	59	27	4	8		98	
Women's Section	33		6	3		42	

Name of schools or institutions	Hindus	Muslims	Christian	Scheduled caste	Others	Total	Remarks
1	2	3	4	5	6	7	8
37 Bengal Survey School, Calcutta—							
1st year	35	15	-			50	
2nd year	21	-	-			25	
Exercises and special	1	1				2	
38 Government Silk Weaving and Dyeing Institute, Barram- pore	45	8	-			53	
39 Bengal Tanning Institute, Calcutta	13	9	-			22	
40 E B Technical School, Patna	56	26	-	3		85	
41 B G Technical School, Rangpur—							
Armen class	43	4	-			47	
Armen class	3	35	5			43	
42 Edward Industrial School, Bogra	12	30		6		48	
43 Government Technical School, Barisal	32	17	9	5		63	

REPORT OF MR C C GHOSH, B A, F R E S,
DEPUTY DIRECTOR OF SERICULTURE,
BENGAL FOR THE YEAR ENDING 31st
MARCH 1938

The Sericulture Department is now concerned with all the three stages of the silk industry, namely —

- (I) Sericulture proper or cocoon raising,
- (II) Reeling, and
- (III) Manufacturing and weaving

The main activity of the department is however still in the first stage. A general review of the working of this stage will be found elsewhere in this report. Work on reeling was undertaken only last year and has further been expanded this year. Preliminary work on the third stage has been undertaken only this year. Work done during the year in regard to each of the three stages is described in the following pages —

CHAPTER I

Sericulture proper

This work is carried on by cultivators who grow mulberry, rear worms in their houses with mulberry leaves and sell the cocoons when formed. The functions of this department in this connection are —

- (a) Production and supply of disease-free cocoons to the rearers so as to ensure successful cocoon crops

For this purpose (i) seven Government Sericultural Nurseries maintain stocks of worms and also rear seed cocoons for sale to rearers. The rearers are also supplied with mulberry saplings from nurseries to be grown into trees. (ii) Help is rendered to selected rearers to produce seed cocoons for sale to general rearers by supplying examined disease-free eggs to them and supervising their rearing.

- (b) Propaganda, i.e., helping the general rearers with advice, demonstration, disinfection, control of epidemics and recommendations for agricultural loans where necessary

- (c) Research for improvement of cocoons and mulberry started during this year. Research in diseases of worms as well as of mulberry is also being arranged for.

The nursery staff is engaged in work under (a)(i), the propaganda staff in that under (a)(ii) and (b) and the research staff in that under (c).

2 *Seasonal condition of the year* — Sericulture deals with the first stage of the silk industry, viz., cultivation of mulberry and production of cocoons by rearing of worms on mulberry leaves. The operations are largely influenced by climatic conditions which affect both mulberry and the worm and the prevalence or otherwise of disease in the worm.

In Malda district climatic conditions during the first half of the year were fairly normal. But in August-September mulberry was submerged by floods which interfered with rearing to a great extent and also caused delay in

annual root-pruning of mulberry (*murrah* cutting). After root-pruning too the tender shoots were subjected to heavy showers of rain which interfered with necessary cultural operations and growth affecting the quality of the leaves badly. This was one of the factors which led to failure of the Agradhayani *Chhotopolu* crop in November. Towards the end of the year there was scarcity of rain, there being no rain from about October to March. In Murshidabad district drought prevailed in the first half of the year followed by heavy rain. Neither of the conditions were suitable for mulberry which in consequence affected rearing. Many had to give up worms under rearing for want of leaves in the droughty period. The drought was followed by excessive moisture which caused unhealthy conditions.

In Birbhum district the greater part of mulberry situated on the banks of rivers suffered from water-logging due to floods in the rains. After root-pruning there was prolonged drought from about October to March which interfered with growth.

On the whole, therefore, climatic conditions were not favourable. Although an increase in mulberry area was noticeable soon after the rains, adverse climatic conditions and failure of the November crop of worms combined to affect prejudicially the endeavours towards the revival of the industry.

3 *Mulberry* — The general practice is to grow bush from cuttings. This is costly and the leaves too are not of high quality. Since 1930-31 the department has been trying to introduce trees for which saplings grown from cuttings are supplied free from the nurseries. In Malda district out of 42,837 saplings supplied up to 1935-36, the majority was destroyed by the flood of 1936-37, leaving only 7,356 saplings which were reported to be growing. No trees could be planted in 1936-37. During this year 900 saplings only could be supplied as the saplings in Piasbari Nursery too suffered from flood. In Murshidabad district no new saplings were supplied during the year and 1,057 saplings out of those supplied in previous years were reported to be growing. In Birbhum district the time of supplying and planting trees was changed from after-rain to pre-rain as those planted in after-rain did not flourish on account of the long period of dry weather after planting. No trees were therefore supplied during the year and only 1,635 was reported to be growing out of 8,712 actually in the ground the previous year. The change in time of planting may give the trees a chance. Supply of saplings was continued until grafts could be arranged for.

Conditions under which trees are grown by rearers are not quite suitable for good crop. They are usually planted on the edges of mulberry fields, one side of which is a precipitous high wall and the roots hardly get sufficient nourishment. Unless better and suitable conditions are provided trees cannot be said to have a proper trial.

As regards prospects of supply of grafts for trees, seedlings were very successfully grown in Berhampore and Mirganj Nurseries and grafts prepared and planted in Berhampore and Piasbari Nurseries were growing very

well. It only now remains to adopt the method in practice.

4 Cocoon crop.—The two indigenous forms were reared according to custom viz *Nistari* in the warm seasons and one large crop of *Chhotopoli* about November and other smaller crops of the same race in the cold weather. The one-brooded *Barapoli* was reared in Bubbhum and adjacent parts of Murshidabad district.

Chhotopoli crop.—It was unfortunate that the *Chhotopoli* crop in Agraharan (November-December) failed practically everywhere entailing very heavy loss. The position is set forth in the following table.—

loss for over about two to three weeks. Eggs hibernated at a temperature of about 40°F. in refrigerator hatch in about three days. Reared eggs which hatched early gave a fair crop. But worms from properly hibernated eggs although hatching at the same time as last year were overtaken by unexpected dry west winds which coupled with poor larvae due to drought were responsible for very poor cocoons obtained in this crop.

Nistari crop.—In Malda district *C'or* (March) crop suffered from pebrine infection carried over from the *Chhotopoli* crop in November-December although the season was favourable. The Jaisiba (June) crop was very

TABLE I
Rearing of Chhotopoli

Rearing area.	Number of rears concerned.	Percentage of seed used.			Output in bales per bale seed used.		
		Nursery.	Selected rears.	Village.	Nursery.	Selected rears.	Village.
Murshidabad district ..	2,121	-1	7	93	21	12	16
Bubbhum district .	245	-2	15	97	15	23	15
Malda district	7,495	2	5	92	NB	10	9

crops had been successful the receipts would have been at least doubled. Mulberry acreage showed a slight increase from 1 140 to 1 186.

The total cocoon crop secured in the Birbhum district amounted to about 1,944 maunds, fetching about Rs. 39,371 to 1,009 rearers whose number showed a slight increase from 973 in the previous year and the mulberry acreage from 534 to 565.

In Bankura district conditions hardly improved. Towards the end of the year however there were many applications for agricultural loans for starting mulberry.

It will be seen from the above how far the industry is dependent on favourable climatic conditions. In spite of adverse climatic conditions and losses due to diseases the rearers obtained about ten lakh rupees from cocoons raised by them. The figure would have been nearly doubled if all the crops were successful.

5. *Work of the Government Sericultural Nurseries*—Relevant facts as to area, etc., of the nurseries are given in table II below. Other facts will be found in tables III, IX and XV.

The temperature in rearing houses ranged from 60°F to 92°F and humidity from as low as 20 to about 100 per cent. the period from March to May being by and large favourable to worms on account of low humidity. The nursery shared in the seasonal character of the district that is heavy rainfall about September and drought from about October to March.

The nursery performed two functions, viz. raising *Vistara* seed cocoons for general rearers and maintaining stocks of *Vistara* worms and supplying them to other nurseries and seed rearers. For the first purpose it reared a total of about 4 419 kahan cocoons from 29 541 layings of eggs in six crops. The consumption of leaves as harvested with twigs per kahan of cocoons produced was about 2½ lbs. on the average for the whole year and the average cost of production was Rs. 1-4-3 per kahan. For the second purpose it reared about 1 201 kahan *Vistara* seed cocoons from 7 409 layings in six crops at an average consumption of 3½ lbs. of leaves and at an average cost of Rs. 2 per kahan. The higher consumption of leaves and higher cost are due to rejection of leaves considered unsuitable in any way and smutting.

TABLE II

be done next year. About 5 000 c ft of compost was made.

Other crops—Due to successive floods during the preceding two years several reclaimed plots could not be planted with mulberry and paddy, gram, mustard and oats were cultivated on them.

Pest, construction and repairs—Five new type rearing houses with sufficient ventilation were built this year to replace those destroyed by floods. Necessary repairs to the existing houses were also carried out. The total cost amounted to Rs 7 950 and the work was carried out by the nursery staff.

Reclamation of land—This nursery situated in a marshy area has been reclaimed by digging and clearing tanks and utilising the earth and silt thus available in raising the level of lands for mulberry. One old tank (110' x 100') was reclaimed this year and a neighbouring ditch converted into mulberry land at a cost of about Rs 449.

Mulberry grafts—A preliminary trial with grafts was attended with very promising results.

School and sericultural training—The nursery has a school attached to it for training of rearsers' sons. Three students completed the full year's course.

The nursery engaged as labourers 100 rearsers' sons for rearing work during the year.

(i) **Berhampore Nursery** is situated in the outskirts but within the municipal limits of the Berhampore town in Murshidabad district. The rainfall during the year was 75.43 inches as against 59.72 and 37.23 inches during the preceding two years. From November onwards there was no rain except for a small shower (8.9 inches) in February. The soil is clayey loam and suitable for mulberry. Preliminary trials on seedlings and grafts have been carried out here with very promising results.

With the discontinuance of the steamer service communication with this nursery has become difficult. The soil is alluvial and suitable for mulberry. The rainfall during the year was 46.72 inches and the conditions for rearing were generally favourable. The maximum and minimum dry bulb temperature in rearing houses was 87°F and 63°F and the percentage of humidity varied from about 76 to 100. Five crops of leaves were harvested from tree mulberry and six crops from bushes. Manures used were tank silt, cowdung and compost.

The nursery carried out rearing of 771 kahan *Nistari* seed cocoons for general rearsers from 4 388 layings at an average consumption of 28 seers leaf and at an average cost of annas 12.6 per kahan of seed cocoons produced. Eighty-five per cent. of the seed cocoons was sold to rearsers for use as seed. This was satisfactory.

The nursery also maintained and supplied stocks of *Nistari* worms to other nurseries and selected rearsers. For this purpose 618 kahan seed cocoons were reared in six crops from 4 223 layings at an average consumption of 33 seers leaf and at an average cost of Re. 1-0-1 per kahan of seed cocoons raised. Out of the total quantity reared about 18 per cent. was supplied to other nurseries, about 29 per cent. to selected rearsers, about 4 per cent. to ordinary rearsers, about 3 per cent. was used in the nursery itself for reproduction and about 46 per cent. was sold for reeling.

The nursery also reared *Nistari* and *Nirmo* worms for trial.

(ii) **Kalitha Nursery** is situated at a distance of 3 miles from Nalhati railway station in Birbhum district. The soil is hard clay mixed with stones typical of the district and hardly suitable for good growth of mulberry, the location of the nursery being unfortunate in this respect. The nursery suffered from the drought prevalent in the district in the latter half of the year. The rainfall was 58.31 inches as against 75.57 during the previous year. Cost of production of mulberry in the nursery is very high. The nursery reared about 1 450 kahan *Nistari* seed cocoons from 11 414 layings at an average consumption of 37 seer leaves and at an average cost of annas 12.11 per kahan. The nursery also reared 148 kahan *Barapoli* cocoons from 2 398 layings at an average leaf consumption of 37 seers and at an average cost of Re. 1-14-6 per kahan. *Nistari* and *Nirmo* races were also reared for trial.

(iii) **Bogra Nursery** is situated on Sherpur road at a distance of about 3 miles from Bogra town. The soil of the nursery is red loam, not typical of the area which is mostly alluvial. Neither the soil nor the situation of the nursery is very suitable for rearing mulberry. The rainfall was 68.62 inches as against 60.20 inches during the preceding year. The dry bulb temperature in rearing houses varied from a minimum of 61°F to 94°F and the percentage of humidity from 76 to 99. The seed cocoons were far from normal and excessive rain from May to October and hardly any rain from November to March. Dust-laden winds are pernicious to worms for a part of the year.

This nursery was meant especially for maintaining and carrying on selections of *Chhotopolu* worms. All the strains being carried on were tested thoroughly and it appeared there was hardly any justification for pulling them on in small lots as none showed any superiority in any respect. Therefore several lots were discontinued and fresh lots from villages in Murshidabad, Birbhum and Bankura were secured in their places.

No improvement has been possible in the case of *Chhotopolu* through selection carried on for a long time. No improvement seems to be possible in this way. The possible lines are a first cross with this race or replacement of this race altogether. A possible such race is *Nistid* which is being given a trial. First crosses can be attempted only when a suitable univoltine acclimatised race is available. Attempts are also being made in this direction.

The nursery reared 717 kahan *Nistari* seed cocoons from 4,377 layings of eggs of which about 14 per cent was supplied as stock to other nurseries and selected rearers and about 37 per cent was sold as seed to ordinary rearers.

About 28 kahan *Chhotopolu* seed cocoons was reared from 296 layings of which a small quantity, viz., about 6 pons was supplied to other nurseries. Ordinary rearers took no *Chhotopolu* seed from Government nurseries. The nursery also reared 43 kahan *Nistid* seed cocoons from 613 layings and 7 kahan *Nismo* from 89 layings and 9 kahan *Eri* from 11 tolas of eggs. *Nistari*, *Chhotopolu*, *Nistid* and *Nismo* cocoons were reared at an average consumption of 43 seer leaf and at an average cost of Re 1-10 per kahan. *Eri* worms fed about a maund of leaf to produce one kahan cocoons.

(vi) *Vishnupur Nursery* is situated near Vishnupur town in Bankura district. The soil of the nursery is hard gravelly and not quite suitable for mulberry. Rainfall was 59.18 inches as against 66.42 inches during the preceding year. The temperature inside the thatched rearing rooms varied from 64°F to 95°F and the percentage of humidity from about 32 to 100. The season was characterised by long drought in the latter half of the year.

The nursery carried out fairly successfully the rearing of *Chhotopolu* yellow and white, *Nistid* yellow and white and *Nismo* races at an average cost of production at Re 1-12-4 and average consumption of about one maund leaves per kahan.

(vii) *Kurseong Nursery* is situated at Constantia about two miles from Kurseong railway station at an elevation of about 4,500 ft. The great drawback of the place is its heavy rainfall which was 149.97 inches as against 173.9 inches during the previous year. On account of extreme cold rearing has to be stopped from about the middle of November to about the middle of March. Except for two periods, viz., spring and autumn, the weather is foggy, cloudy and rainy. The nursery buildings stand and mulberry beds are prepared in narrow terraces on steep stony hillsides, the soil in the terraces being full of sand and stones.

Bush mulberry does not grow well. Mulberry stems get covered with a thick encrustation of lichen and fungi which however have proved to be amenable to a caustic soda wash at a strength of 25 per cent in water. Stems of medium trees have been observed to be badly liable to attack by a longicorn borer grub (*Monohammus versteegi*) which corrodes just beneath the bark and also bores into the wood. Practically all the medium trees growing in the nursery succumbed to this attack. Mulberry trees however grow in neighbouring villages but it is doubtful if any varieties are immune. On account of these difficulties the cost of production of leaves in the nursery was very high amounting to Rs 2-13 per maund as harvested for feeding with twigs.

The nursery has been maintained for rearing stocks in the hot weather when conditions in the plains are very trying and for rearing univoltine races.

6 *Propaganda and work in districts*—The staff engaged in this work consisted of 4 Inspectors, 9 officers of the rank of Assistant Inspectors and 59 demonstrators.

They carried out the following work—

- (i) 529,624 moths were examined in different circles and 457,608 good layings were supplied to the selected rearers whose rearings also were supervised. A total of 1,072 samples and 55,875 moths was examined to test the prevalence of disease in the seed crops of the selected rearers.
- (ii) In the three principal districts, viz., Malda, Murshidabad and Birbhum a total of 10,764 houses and 337,621 appliances were disinfected.
- (iii) In the same three districts a total of 271 houses were improved by provision of ventilation and protection against the fly-pest.
- (iv) In the same three districts 639 demonstrations on improved methods of rearing were carried out in 139 villages.
- (v) Prompt measures were taken to deal with any disease which appeared in epidemic form. The number of cases in Malda district alone was 120. The only disease which proved amenable to treatment was muscardine.
- (vi) Census about cocoon production, about the kind of seed used by rearers and results obtained therefrom, about mulberry acreage, number of rearers, looms, reeling basins and economic census about the cost of mulberry cultivation, and of rearing, reeling and weaving were carried out. An economic census about silk weavers with a view to formation of guilds was in progress.
- (vii) Agricultural loans for sericultural purposes were distributed and realisation of dues on account of these loans was carried out.

7 *Sericultural training*—Training in improved rearing methods is imparted in two

ways. Two schools are maintained, one attached to Berhampore Nursery and the other to Piasbari Nursery and rearers' sons are admitted into them on payment of stipends the amount of which was reduced to Rs 5 from Rs 10 when some students left. The amount was then raised to Rs 8 and five students completed the course. Another form of practical training is to engage rearers' sons in rearing work in the nurseries. About 150 were engaged during the year.

8 *Sericultural education*—Sericultural education of an elementary nature is imparted to boys and girls in 7 primary schools to which the department makes monthly grants varying from Rs 5 to Rs 7. These schools were attended by 372 boys and girls mostly rearers' children. The demonstration staff gave occasional lectures to 1858 boys and girls in 125 primary schools.

9 *Agricultural loans*—An amount of Rs 6,698 was paid as loans to 771 rearers in Malda district and Rs. 3,084 was realised of past loans. In Murshidabad district no loan was issued while Rs 2,179 was realised of past loans. In Birbhum district no separate record was kept of agricultural loans given for sericultural purposes. Until all outstanding loans were realised no loans for sericultural purposes could be issued. No loans were issued in Bankura district.

10 *Rewards to selected rearers*—This year 194 rearers were selected for payment of rewards amounting to Rs 10,000 in Murshidabad, Birbhum and Malda districts for improving their houses for rearing seed cocoons.

11 *Exhibition and publicity*—Opportunity was taken to put up sericultural exhibits including improved reeling demonstration in the district exhibitions and shows.

12 *Charge and tour*—Deputy Director of Sericulture Bengal remained in charge of the department and was on tour for 181 days. Mr. Satish N. Bose 1st Superintendent of Sericulture Bengal was on tour for 150 days and Mr. M. L. Cleghorn 2nd Superintendent of Sericulture Bengal for 120 days.

of two French experts who however worked only for a short time. The results of these attempts were reviewed in 1922 and being found unprofitable research was stopped and the Research Officer was transferred to the general department as a Superintendent of Sericulture. Since then the department has been concentrating only on the indigenous races of worms. As regards mulberry some varieties collected by late Mr. Cleghorn are still growing in the compound of the abolished nursery at Tollygunge. As regards diseases no work could be undertaken in Bengal until last year.

2 On representation of the need for research, the Imperial Sericultural Committee sanctioned with effect from April 1937 one Biological Officer to work on improvement of races of worms and one Botanical Officer to work on improvement of mulberry. One M.Sc. in Zoology and one M.Sc. in Botany were recruited for these posts and given a preliminary training in Sericulture for about three months at Berhampore Nursery. The Head of the Department of Zoology of the University kindly procured from the Calcutta University sanction for one bigha of land for mulberry in the compound of the College at Ballygunge and accommodation for rearing and laboratory and agreed to help the Biological Officer with advice and guidance. The Biological Officer commenced work here about the end of July. The Botanical Officer also commenced work about the same time at Narayanpur Dum Dum on the land and building donated by Mr. Haridas Mozumdar. The Head of the Department of Botany of the University College kindly agreed to help him with advice and guidance. Both the officers worked under direct supervision of the Director who visited their work every month.

3 For improvement of multivoltine cocoons the Deputy Director of Sericulture had done some work in Burma and obtained several high yielding races which were brought with him when he came to Bengal in July 1936. On arrival here two of these races viz. *Nitid* and *Nymo* proved promising and have since been adopted by the rearers in Murshidabad, Birbhum and Bankura. Their behaviour is described elsewhere in this report.

4 The Biological Officer undertook work on three distinct lines viz. (1) production of mixed improved hybrid multivoltine races with the Bengal *Nitari* race on the lines on which *Nitid* and *Nymo* had been successfully evolved. A race named *Itan* has been produced and is in course of fixation and seems promising. *Nitari* race is used to high Bengal temperatures and it is hoped that *Itan* will acquire this hardy quality. (2) Maintenance of the race found suitable for rearing in Bengal viz. *Nitari Chhotopoli Barapoli Nitid* and *Nymo* in a pure selection condition. (3) Trial of the first cross between *Nitari* and *Nymo* and foreign races.

A few remarks have been made in (1) and (2) about the work done in (3).

5 The Biological Officer took up his laboratory work at the College of mulberry at Ballygunge. He found the place and the trees of *Morus indica* and worked

out their characters in order to differentiate the varieties. Land was got ready to put down the varieties separately in order to study their behaviour. He also started growing seedlings and carried out grafting and raised grafts with some of Cleghorn's varieties.

6. The Imperial Sericultural Committee has sanctioned with effect from April 1938 two more research officers, viz. one Protozoologist to work on diseases of silkworms and one Agricultural Chemist and Biochemist to work on chemical problems connected with culture of mulberry, feeding of worms, nutritional value of different varieties of mulberry and *tulra* disease of mulberry. Laboratory accommodation and guidance have been promised by the Head of the Department of Zoology of the University College of Science for the Protozoologist and similar help and guidance have been promised by the Heads of Chemistry and Applied Chemistry Departments for the Agri-Biochemist.

CHAPTER III

Reeling Industry

Peddle Reeling Institute

As one of the measures adopted for improvement in reeling the starting of the Peddle Reeling Institute at Malda was mentioned last year. It commenced work from January 1937. During the year it was worked by the existing sericultural staff with funds from the normal budget of the Sericultural Department and with the newly designed eight-basin plant burning wood fuel, with treadle reeling machines and with a hand operated sixteen hank re-reeling machine. Towards the end of the year it was provided with its own budget and staff and increased accommodation and equipment. The Malda District Board continued to pay 6 stipends and the English Bazar Municipality the pay of the durwan. The existing reeling shed with corrugated iron sheet roofing was improved with the addition of a ceiling to prevent heat, with glass windows on the north wall for better light and with a cemented floor. A proper masonry cocoon store, a building for office with accommodation for store, etc., and a hot air cocoon drying chamber were built. An up-to-date four-basin Japanese reeling machine with necessary cocoon cooking and re-reeling sets, simple testing machines, boiler for steam, overhead tank for water, and motor for driving the new reeling and re-reeling machines with necessary steam and water connections were added to the equipment. The new staff was also recruited towards the end of the year and consisted of a B.Sc. in mechanical and electrical engineering of the Benares Hindu University as officer-in-charge, a diplomate of the Jadavpur College of Engineering and Technology as mechanic and a passed student of the Silk Weaving and Dyeing Institute, Berhampore, as helper.

2. As regards actual working of the Institute it started with a number of reelers' sons as learners on payment of stipends of Rs. 8 per month. The value of the stipends was however reduced to Rs. 6 which was not sufficient to maintain the trainees in the town and they left. A few bhadrak boys however volunteered to take training on the

reduced stipends. They were admitted with the hope that after training they would start reeling on their own account. Nine trainees left after about one to seven months' work of whom one has started reeling on his own account and a few contemplate starting on co-operative lines. One after ten months' training has been employed in the demonstration party. Eight were under training at the end of the year.

3. The working of the Institute was interrupted for the above reason and also for want of cocoons owing to failure of the *Chhotopolu* crop in November-December. It will yet take some time to systematise the work properly. A part of it will be used for imparting training and a part will be run strictly on commercial lines.

The institute worked for 220 days reeled 3,680 kahan cocoons at a cost of Rs. 3,048-1-6 and produced 5 maunds 36 seers 1 chittak raw silk and 4 maunds 25 seers 9 chittaks waste which together fetched Rs. 2,805-14-9. The trainees all new hands and bhadrak boys did the reeling and enjoyed Sundays and holidays and were also paid for days on which no reeling was done. Taking these into consideration the Managing Committee considered the results as satisfactory. The raw silk produced fetched the highest price in the local market. Of the different varieties of cocoons reeled *Nistari Nismo* and *Italian* fetched a profit while *Nistari* and *Chhotopolu* caused loss.

4. *Raw Silk Conditioning House*—The other measures taken to improve reeling was the starting of the Raw Silk Conditioning House in a hired building at 2, Strand Road, Howrah, towards the end of the year when the machinery arrived. The Officer-in-charge who was appointed left soon after appointment and steps were being taken to recruit a suitable hand. An illustrated bulletin entitled "The Bengal Government Raw Silk Conditioning House and marketing of raw silk with its help" (No. 76 in English and No. 77 in Bengali) giving the object and methods and rules of working of the Conditioning House was in the press.

Manufacturing Industry

A scheme for developing and helping the silk manufacturing industry of the province was approved by Government. It contemplated the reorganisation of the existing Silk Weaving and Dyeing Institute, Berhampore, so as to be able to impart a thoroughly practical training to students, to arrange for proper throwing, weaving, dyeing, printing and finishing, to arrange for examination, conditioning and marketing of fabrics and to work in close co-operation with the silk weavers who would be combined into guilds. Money was provided for the scheme and a thorough economic census of the silk weavers was in progress with a view to formation of guilds.

CHAPTER IV

A general review of the working of the Sericultural Department

Factors of successful rearing of worms—Successful rearing of cocoons by the rearers is the result of a combination of (1) freedom

from hereditary pebrine disease on the part of the worms under rearing, (2) food, i.e., mulberry leaves, (3) climate and (4) nursing

2 Pebrine disease is protozoal and besides being hereditary is contracted by contamination through contact and contaminated food. Its germs multiply in the body. It can be controlled only in Pasteur's method by examination of the body substance of moths under a high power microscope in order to eliminate those infected with it. This examination is necessary every generation so as to keep it under control and prevent it from assuming lethal proportions.

3 Hard, dry, dusty and otherwise undigestible food and high temperature are the principal factors for causing flacherie, a disease, like diarrhoea. Wet and tender food leads to grasserie, a disease like dropsy which is aggravated by want of ventilation in the rearing room. Worms are also liable to a fungal disease, muscardine which is helped by wet conditions.

4 The optimum climatic conditions as far as rearing is concerned are a temperature of about 70°F to 75°F and humidity of about 70 to 75 per cent. A range of both from 65 to 80 is not quite unsuitable but when beyond these figures the conditions are difficult and unsuitable. Cocoons spun in rainy weather again do not reel well. Food and nursing constitute about 70 per cent of rearing. If food, nursing and climate be favourable evil effects of the presence in moderate proportions of pebrine germs in the body may be overcome. Similarly food, nursing and freedom from disease may help in overcoming moderate difficulties about climate.

5 Rearing of worms is thus always attended with some risks owing to circumstances some of which are beyond the control of the rearer. The obvious precautions which minimise risk are freedom from disease in the worm, and provision of sufficient good food. The conditions at present in Bengal regarding both these precautions are not satisfactory. A fair amount of skill in rearing i.e. nursing is not wanting in the case of the rearsers. What affects rearing most however at present is climate. This year when floods submerged mulberry rearing was prevented from being undertaken over the greater part of the rearing districts, the leaves themselves were spoilt and rootpruning and necessary cultural operations of mulberry were not done in time. Unusual rain after rootpruning affected growth as well as quality of the new leaves. Long periods of drought interfered with growth of mulberry which is wholly dependent upon rain and whatever leaves were obtained were not quite suitable for proper nourishment of the worms. Heavy rain, floods and drought are of frequent occurrence. Unexpected advent of very high temperature or continuous rainy weather are sources of trouble. Silkworm rearing is therefore not always a sure undertaking. It is a hard and subsidiary nature has kept it this and will do so. The rearing families themselves do the work themselves and the loss of a crop in between successful crop is not felt so much.

No single factor can be held responsible for failure of or poor success in rearing. It is

however necessary to take all possible precautions.

6 As a necessary precaution against pebrine disease Pasteur's method is universally followed of examining the mother moth and rejecting her eggs if pebrine spores are found in her blood. This method of cellular egg production with necessary disinfection controls this disease effectively. In Japan all eggs have to be examined by Government controlling stations and certified before they can be sold to rearers or reared. Mysore is adopting similar methods and has found examination of all eggs for general rearers to be essential and examined eggs to be very successful and is adopting measures so as to bring all egg production and supply under Government control.

The Bengal method of "seed cocoons"

7 Apparently after the method of "industrial egg" production in France in which though reared from cellular eggs the industrial egg required for use by ordinary rearers is not wholly examined but partially tested for freedom from disease, a method of "seed cocoon" production was adopted in Bengal and has been in vogue since the beginning of the department. The seed cocoons reared from cellular eggs are sold to the general rearer who takes eggs from moths which cut out of these cocoons and rears these eggs without any further examination. The nurseries produce and sell such seed cocoons to rearers. In order to increase the production and supply of such seed cocoons ex-students of the existing sericultural schools attached to two nurseries and some of the general rearers are given monetary help to improve their houses and are enrolled as "Selected rearers" and made to produce and sell seed cocoons reared from cellular eggs sold to them by the department. The subvention received from the Government of India was utilised almost wholly to increase the number of selected rearers.

8 In order to find out how the system was working, how far the department was fulfilling its main function of disease-free seed production and supply and how far the rearers were availing of and benefiting by the efforts of the department a special enquiry was undertaken this year and the results are summarised below —

As regards actual seed production and supply of the two races of worms in demand viz., *Vitari* and *Chhotopolu* the work of the different Government nurseries during this year is shown below in Table III—

TABLE III

Name of nursery	Quantity of seed cocoons produced			What proportion sold to rearers
	K.	P	G	
Mirzanj	771	3	0	85
Piasbari	4 419	6	12	91
Kali ha	1 449	9	10	56
Berhampore	2 920	9	0	46
Kurseong	124	7	10	40
Bogra	735	12	5	37
Vishnupur	345	1	8	15
	10 766	1	5	

Thus about 51 per cent of the seed cocoons produced in the nurseries were utilised by the rearers.

9 The selected rearers services too are not being fully utilised as will be evident from Table IV below —

TABLE IV

District	Number of rearers in the district who carried out rearing during the year	Number of selected rearers including ex-students who produced seed cocoons	Seed cocoons produced by the selected rearers	Proportion of these 1 cocoons sold to rearers
			K P G	Percent
Malda	10 450	183	10 704 7 2	61
Murshidabad	3 701	129	16 501 1 10	-
Birbhum	1 000	106	10,351 4 0	39
	14 850	423	37,946 8 12	

Thus only about 36 per cent of the seed cocoons produced by the selected rearers were

utilised by rearers. Clearly it would be a mistake to go on increasing the number of selected rearers by paying stipends of Rs. 100 and Rs. 50 as was contemplated and being done under the Government of India scheme. This was partly changed during the year. A number of the best of the rearers already selected sufficient to produce about 30 000 Indian seed cocoons with the stipend be continued on payment of a small stipend or rewards of Rs. 25 or 50 as may be necessary to enable them to support their families and appliances in proper order until the system is reorganised.

10 It was not that there was no demand for more seed cocoons. More than 100 per cent produced by the nurseries and selected rearers together was actually used. Instead of coming to the nurseries and selecting the best majority of the ordinary rearers of the unexamined villages selected rearers. This has become evident on a system of cocoons being instituted and carried out during the year. The relevant facts gathered from the census are given below distributed by district in Table V.

TABLE V

Malda district

There is no doubt about the high percentage of unexamined village seed used in the case of *Barapoli* and *Chhotopoli*. In the case of *Nistari* however as nursery and selected rearers seed is passed as village seed and *vice versa* as detailed below there is some doubt as to reliability of these figures. But it is certain that more than half is village seed.

11. An attempt was made to find out the results obtained by rearers from seed cocoons of nurseries and of selected rearers and also from unexamined village seed cocoons. The results as ascertained by the census are given in Table VI.

TABLE VI

Nistari worms

Place	Crop	Number of rearers concerned	Percentage of—			Outturn of cocoons kahan or seer per kahan or seer		
			Nursery seed	Selected rearers' seed	Village seed	Nursery seed	Selected rearers' seed	Village seed
Malda district	Bhaduri (September)	7,397	20	23	57	51	50	In seer
	Nimketa (October)	904	14	6	80	62	52	47
	Agrami (December)		3	12	85	59	60	48
	Maghi (February)	75	6	25	69	60	44	50
Birbhum district								Kahan
	Choitra (April)	12		100			63	
	Baisakhi (May)	294	28		72	43		42
	Jaistha (June)	8		100			47	
	Ashari (July)	16			100			38
	Sravani (August)	698	17		83	56		52
Murshidabad district	Early Choitra (March)	16	100					39
	Choitra (April)	1,195	100			54		
	Baisakhi (May)	371	11	4	85	57	42	62
	Ashari (July)	598	9	10	81	42	55	24
	Sravani (August)	1,849	9	3	88	56	75	59
	Bhaduri (September)	1,162	6	24	70	60	55	51
	Aswina (October)	728	43	57		41	84	
	Agrami (December)				100			96
	Falguni (March)	666	41	51	5	48	1	50

Chhotopoli worms

Birbhum district	Aswina (October)	573	18		82	63		47
	Aghrani (December)	245	2	18	80	15	26 6	15 4.
Malda district	Ditto	7,095	019	8	92	Nil	18*	9*
Murshidabad district	Choitra (April)				100			60
	Baisakhi (May)				100			48
	Bhaduri (September)				100			40
	Aswina (October)				100			44
	Aghrani (December)	1,686	1	7	93	20	12	16
Palasi village in Bandi Circle	Ditto	7			100			100†
	Falguni (March)			5	95		17	22

*The representative from one seer seed cocoon

†A very exceptional and rare case but sufficient to shake the confidence of rearers in nursery seed

Complete reliance cannot be placed on seed cocoons as regards freedom from disease even though reared from cellular eggs. There are risks of contamination through various sources and seed cocoons reared from cellular seed are actually found to be infected.

12 Tests carried out for finding out the extent of infection in sample (80 cocoons) of selected rearers' seed cocoons reared from cellular eggs given from nurseries revealed presence of infection to an appreciable extent (Table V) which would certainly increase in the resultant crop. This is actually what is happening.

TABLE VII

	Number of samples tested	Percentage of infection present
Malda district—		
Kalahachak circle	103	0 to 5
Piasbari circle	90	1 4 to 4 7
Barogharia circle	126	2 4 to 4
Englishbazar circle	190	1 to 8 6
Murshidabad district	336	0 to 12
Birbhum district	227	3 6 average

13 The seed cocoons produced in the nurseries too are seldom totally disease free and show a similar proportion of disease. Under the existing circumstances they cannot be kept disease-free. When the worms are under rearing bands of rearers, the prospective buyers of the seed cocoons, visit and handle the worms. This is the custom but it militates against the principle of cellular seed production. It is mainly these visitors who bring in contamination. Also the nurseries are compelled to purchase outside leaves on account of large rearings carried on. All these sources of infection cannot be stopped as long as the nurseries rear seed cocoons for sale to general rearers. The seed cocoons produced at present are not wholly disease-free and cannot be made disease-free under the existing circumstances. There are further complications brought about by seed dealers who go about hawking seed cocoons. Cases are known in which village seed cocoons have been passed as nursery ones and *vice versa*. The price factor is responsible for this state of affairs to a very great extent. With the low price of cocoons the rearers naturally tried to get seed as cheap as possible and use any cocoons for seed purposes provided they were cheap. The common rearer's methods and houses too are not sanitary. They can be improved only through propaganda and education about improved sanitary practices. The first necessity however is to keep the source of seed pure. Conditions cannot be expected to improve otherwise. No race of worm can also be said to have a fair trial unless it is reared from disease-free seed and under sanitary conditions.

CHAPTER V

Economic Survey of the Silk Industry

An attempt was made to find out the actual cost of mulberry cultivation, of rearing, of reeling and of weaving. The major portion of the work in mulberry cultivation, rearing and weaving is carried out by family labour.

Therefore actual hours of work were noted and wages calculated for those hours at current rates. Mulberry cultivators, rearers, reelers and weavers were selected in different tracts, their places regularly visited by demonstrators and work, hours of work and cost incurred in kind or cash noted. In this way a fair idea was obtained as to the economics of the different stages of the industry.

Economics of mulberry cultivation

2 *Cost of starting a bigha of bush mulberry according to present methods*—Cost of starting a bigha of mulberry according to existing methods is about Rs 30 to Rs 35 in the first year. The statistics given below show the cost of maintaining a bigha and the cost of production of leaves.

TABLE VIII

Cost of production of leaves as harvested with twigs by rearers and as determined by actual census —

	Malda.	Murshidabad.	Birbhum
(1) Period of observation	November 1936 to October 1937	1st April 1937 to 31st March 1938	May 1937 to 31st March 1938
(2) Area under observation in bighas	84 bighas 16 cottas	16 bighas 10 cottas	14 bighas 14 cottas
	Rs a. p.	Rs a. p.	Rs a. p.
(3) Cost for labour for cultivation—			
(i) Family	50 15 0	55 4 6	35 11 6
(ii) Hired	810 4 6	131 15 0	30 14 6
(4) Cost of manuring—			
(i) Price of own manure	148 10 0	72 8 0	9 12 0
(ii) Price of purchased manure	127 2 3	16 0 0	10 0 0
Spreading cost—			
(i) Family	13 5 6	9 6 0	1 5 0
(ii) Hired	111 0 3	26 0 0	22 1 6
(5) Rent	99 10 0	48 6 0	38 15 0
(6) Total cost of cultivation.	1,369 15 6	359 7 6	157 11 6
(7) Less price of roots and sticks sold.	53 10 9	14 10 0	16 12 0
(8) Net cost of cultivation	1 316 4 9	344 13 6	140 15 6
(9) Yield of leaf in maunds	5 381½ mds	1,264½ mds	838 mds
(10) Average yield per bigha	63½ mds	76½ mds	57 mds
(11) Average cost of cultivation per bigha.	Rs 15 8	Rs 20 14	Rs 9-9
(12) Average cost per maund of leaf.	As 3 10	As 4-4	As 2 9
(13) Average cost per lb	57p	65p	42p

These rates are arrived at on the calculation of actual hours of work of own labour and wages for only those hours. This is not feasible in practice. The wages too are calculated at very low rates. Therefore about 50 per cent over the figures obtained may be taken to represent a fair economic cost. The average according to census figures of the three districts comes to 3 annas 8 pies per maund. A fair economic average cost of production is 5 annas 6 pies per maund or 8 pies per lb or 1 6 pies per seer. This will be evident when the actual cost shown

below (table IX) of cultivation in Government nurseries where all labour is paid for is considered.

3 *Prospects of trees*—In Bogra Nursery plot No 28 two bighas in area was planted with trees 10 ft apart on 25th July 1931 there being 237 yielding trees

In 1933-34 yield in 5 harvests was 69 mds 27 srs or 231 lbs per tree

In 1934-35 yield in 3 harvests was 44 mds 2 srs or 141 lbs per tree

In 1935-36 yield in 5 harvests was 68 mds 28 srs or 23 lbs per tree

In 1936-37 yield in 5 harvests was 44 mds 6 srs or 141 lbs per tree

In 1937-38 yield in 4 harvests was 25 mds 20 srs or 8 lbs per tree

The yield diminished owing to bad pruning in 1936

In the same nursery plot No 29 half a bigha in area was planted on 6th July 1932 the trees being 12ft apart and 39 in number

In 1934-35 yield was 8 mds 35 srs or 18 lbs per tree

In 1935-36 yield was 9 mds 2 srs or 181 lbs per tree

In 1936-37 yield was 10 mds 34 srs or 22 lbs per tree

In 1937-38 yield was 10 mds 15 srs or 21 lbs per tree

These trees have not been badly pruned

Average yield of trees on road-sides and embankments in Piasbari is about 19 seers or 38lbs. and the maximum yield of a good tree has been about 25 seers or 50 lbs when about 6 years old

The best trees in Mirganj Nursery which have however been badly pruned are yielding about 22 lbs per tree

TABLE IX

Cost of production of leaves as harvested with twigs in nurseries

	Piasbari Nursery	Berhampore Nursery	Mirganj Nursery	Kabitha Nursery	Bogra Nursery	Vishnupur Nursery
<i>Bush</i>						
1 Area in bighas	40½	47½	10	21	3½	18½
2 Average yield per bigha	69 mds	40 mds.	29 mds.	29 mds.	32 mds.	33½ mds.
3 Cost per maund	As. 8-2	As. 10 1½	As. 11-8	Re. 1-3-1	As. 13-6	As. 9-9
4 Cost per lb	1 22½ p	1 5 p	1 75 p	2 86 p	2-62 p	1 46 p
<i>Bush and trees mixed</i>						
1 Area in bighas	Nil	63½	30	20	10(a)	8
2 Average yield per bigha		19 mds.	28½ mds	15½ mds.	46½ mds.	12½ mds.
3 Cost per maund		Re. 1	As. 12-1½	Re. 1-7 1	As. 12-8	Pe 1-6-6
4 Cost per lb		2 4 p	1 81 p	3-91 p	1 9 p	3 375 p
<i>Trees in fields</i>						
1 Area in bighas	12	25½	14½	20		1½
2 Number of trees	600 (b)	2,632	4,617	944	2,205	955
3 Yield per bigha	3½ mds	11½ mds.	7 mds	4½ mds.		
4 Average yield per tree	3 seers	4½ seers	1 seer	1½ seers	3 seers	1½ seers
5 Cost per maund	Re 1-9-3	As. 12	Re 1-6	As. 13-0	As. 12-8	As. 13-6
6 Cost per lb	1 63 p	1 8 p	3 3 p	2-06 p	1 9 p	2-62 p
<i>Trees on road-sides and embankments</i>						
1 Number of trees	800	1,375	480	1,600	300	250
2 Average yield per tree	19 srs	9½ srs	4 seers	2½ seers	5½ seers	2½ seers
3 Cost per maund	As. 4-11	As. 4-8	As. 5-6	As. 2	As. 2-3	As. 6-0
4 Cost per lb	73 p	7 p	82 p	1 85 p	33 p	1-01 p
<i>1 bush and trees combined</i>						
1 Cost per maund	As. 7-6	As. 15	As. 13-3	Re 11	As. 12-3	As. 12
2 Cost per lb	1 47 p	1 95 p	1 55 p	3 p	1 53 p	1 8 p

(a) Practical result

(b) Damaged by flood

As the Nursery is not included in the statement where mulberry attempted to be grown as bush in 1934-35 and the cost per lb of leaf amounted to 6 75 p. The cost of production in Kabitha Nursery is generally high the explanation being the unsuitability of the land for mulberry. This remark is applicable to Bogra and Vishnupur.

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On a bigha of land about 140 trees can be grown with care about 10 ft apart. If trees are properly grown and trained about 30 lbs leaves per tree can be easily expected when about five to seven years old or about 50 maunds of leaves per bigha and the cost per lb of leaves is expected to be in the neighbourhood of 4 pies.

4 *Economics of rearing or cocoon production*—Cocoon-growers or rearers of worms grow their own mulberry as bush in fields like other crops, purchase and stock rearing trays (*dala*), spinning trays (*chandraki*) purchase seed cocoons, keep the seed cocoons spread on trays and take eggs from the moths which emerge from the seed cocoons, feed the worms which hatch from the eggs with mulberry leaves three to four times during day and night for about three to five weeks on dalas arranged on shelves in a corner of their house or in a separate house, pick out and place on *chandraki* ripe worms ready to spin cocoons and then pick off the cocoons from *chandrakis* and sell them.

TABLE X

Cost of production of cocoons (mainly *Nistari*) by rearers as determined by actual census —

	Malda	Murshida bad.	Birbhum
(1) Period of observation	November 1936 to October 1937	1937-38	May 1937 to March 1938
(2) Number of rearers under observation	20	8	7
(3) Labour for rearing—	Rs a p	Rs a p	Rs a p
(i) Family	745 13 9	209 7 6	134 2 6
(ii) Hired	311 10 6	11 12 6	24 16 6
(4) Quantity of leaf fed—	Md. sr ch	Md sr ch	Md sr ch
(i) Own leaf	4 614 11 0	1 195 37 8	681 9 6
(ii) Purchased	911 0 0	119 30 0	110 26 8
	Rs a p	Rs a p	Rs a p
(5) Price of own leaf calculated at cost of production	1 125 15 5	337 14 11	146 15 6
(6) Price of purchased leaf actually paid	461 1 3	97 0 0	82 8 0
(7) Disinfection—			
(i) Family labour	17 13 0	10 1 6	13 11 3
(ii) Hired labour	10 2 0	1 2 0	2 9 6
(iii) Disinfectant	17 10 3		23 2 7
(8) Depreciation of appliances—			
(i) Own appliances	109 13 0	34 14 9	28 0 0
(ii) Hired	40 10 3	2 4 0	0 5 0
(9) Miscellaneous expenses—			
(i) Family	28 5 9	22 0 3	16 4 6
(ii) Hired	28 11 9	4 15 6	9 5 0
(10) Price of seed cocoons less price of pierced cocoons	138 13 3	33 13 6	27 10 0
(11) Total cost of rearing in the year	3 036 7 8	825 5 11	503 4 4
	Md sr ch	Kahans	Kahans
(12) Total outturn of cocoons	204 13 8	1,838 or 1,379 seers	1,340 or 1,072 seers
(13) Average cost of cocoons per seer	As 6	As 9	As 7-6
(14) Quantity of leaves required for producing one seer cocoons	27 seers	36 seers	29 seers (a)
(15) Out of the cost of production—percentage of—			
(a) Cost of leaf	52 2	52 7	44 4
(b) Cost of labour	34 8	34 2	31 6
(c) Cost of seed	4 6	4 2	5 5
(d) Miscellaneous cost	8 4	8 9	18 5 (b)

This cost is arrived at by taking actual hours of work devoted to rearing and calculating wages for the actual hours of work at the

(a) The average consumption of leaves with twigs is 31 seers for every seer of cocoons and agrees with what is observed in nurseries where leaves fed are weighed.

(b) The miscellaneous cost in Birbhum is high on account of unusually high expenditure for disinfection.

very abnormally low rates prevalent. Such strict adherence to hours of actual work and payment for those hours are not feasible in practice. It does not take into account the failures or poorness of the product due to adverse climatic conditions, floods, drought and disease of worms and mulberry. The quantity of leaves shown as required for seer of cocoons is the actual quantity fed. Usually there is some wastage. The cost of own leaves is calculated at the rates arrived at in the census for leaf production and not at 8 pies per lb. Frequently rearers are compelled to purchase some leaves to complete their rearing. In Birbhum and Murshidabad districts the average price at which leaves have to be purchased is about 4 8 to 6 pies per seer on account of scarcity of leaves in these districts. In Malda leaves are bought and sold at about 2 2 pies per seer. The cost of seed is also to be considered. At present only seed cocoons are used and not eggs. The cost of production of seed cocoons in Government nurseries is about Re 1-2 per seer or kahan. A kahan is sold from Government nurseries at Rs 1-4. On account of the depression and low price of cocoons rearers at present mostly go in for village seed costing about half to three-fourths of the nursery seed. For success of the industry it is necessary to have disease-free layings in place of seed cocoons. For examining the layings obtained from a kahan of seed cocoons about Re 1 is necessary. The cost of a laying of eggs will amount to 1 pie and about 8 layings are required for one seer of cocoons. During the last few years of depression the experience has been that when cocoon prices went down to about Rs 16 to 18 per maund or about 6½ annas or 7 annas per seer many gave up mulberry. When cocoons began to sell at Rs 20 per maund or 4 annas per lb or 8 annas per seer things began to brighten no doubt but no one showed any enthusiasm to resume mulberry cultivation and rearing. Enthusiasm was evident only when cocoon prices ranged near about Rs 25 per maund or 5 annas per lb or 10 annas per seer. A price of Rs 30 per maund or 6 annas per lb or 12 annas per seer would be distinctly stimulative. It seems that 5 annas per lb or 10 annas per seer indicates the boundary line while for healthy growth of the industry 6 annas per lb would be desirable. Prices went up for a while even beyond Rs 30 this year. It is for these reasons that there were signs of increase in mulberry area and rearing during the year.

5 One great discouragement to cocoon growers is the fact that frequently they are compelled to sell their cocoons at less than actual cost of production as will be evident from the table below —

TABLE XI

District	Cost of production of one seer cocoons as determined by census		Price at which cocoons sold during the year per seer	
	As p	As p	As p	As p
Malda	6 0	7 6	to 11 0	
Birbhum	7 6	5 4	to 7 6	
Murshidabad	9 0	5 0	to 8 0	
Average	7 6	6 0	to 8 10	

6 *Economics of reeling*—Cocoons require to be stifled with heat so that moths may not develop inside and cut out of them. They further require to be dried and then stored. Reeling consists in taking out the continuous filaments of several cocoons together in unbroken condition in the form of raw silk thread. For this purpose the cocoons are boiled in water which is heated either with wood or coal fire or with steam and kept floating in water while being reeled. The external layers of the cocoons consist of broken filaments and require to be removed as reeling waste before continuous filaments are obtained. Unreelable cocoons and the thin innermost cores of cocoons also go to waste and in Bengal are along with pierced cocoons spun with hand into *matka*. Pierced cocoons are those which are not stifled and from which moths are allowed to cut out for laying eggs. They form the major portion of the raw material out of which *matka* is spun. Reeling waste is also being spun into thread with a pedal machine. Raw silk is the main product required out of the sericultural industry. Very efficient and

elaborate machinery have been developed for reeling in other countries. In Bengal however such up-to-date machinery were never adopted even by the large European reeling factories or filatures. The machine used here was a cheap adaptation of the French machine and made practically wholly of wood and each reel turned by a turner. When a number of reeling machines were (and still are) worked together the water in the basins was (still in some cases is) heated with steam generated in a boiler. Where only a few basins are worked they are heated on separate ovens with wood or coal fire. In the statement below of the actual census taken for reeling four kinds of raw silk are shown. Steam basin silk is what is produced with basins heated by steam and is at present of the best quality and generally reeled to a particular denier. *Tana* silk is practically as good as steam basin one and both can be used for warp. *Bharna* is inferior and used in weft. *Ghora* is a very coarse thread containing much dirt and impurity from reeling basins and the unreelable waste and core also are worked into it.

TABLE XII

Cost of production of raw silk

	Malda			Murshidabad	Birbhum	
	Tana	Bharna	Ghora		Khamru	Steam basin
(1) Period under observation	January 1937 to December 1937			1937-38	May 1937 to March 1938	
(2) Kind of cocoon	Nistari and Chhotopolu			Nistari Nistid, Barapolu Chhotopolu.	Nistari Nistid Nismo and Chhotopolu	
(3) Price of cocoon	Rs 2 996-4-6	Rs 9,715-4-3	Rs 716-13 9	Rs 11 649 9 6	Rs 64	Rs 2,633 8-0
(4) Price of cocoon per lb	As 4-1			As. 4 8	As 5 2	As. 2 8
(5) Price of cocoon per kahan	Not known			As 7-7	As. 8-3	As 4 8
(6) Cost of reeling	Rs 370 2 6	Rs 871 12 6	Rs 45 8	Rs 1,080 11	Rs. 7 2	Rs. 362 13 9 ¹
(7) Cost of fuel	Rs. 229 14	Rs. 357 7 6	Rs 22 12	Rs 627-4	Rs 1 12 6	Rs 187 10 6
(8) Cost of water	Rs 36-4	Rs 17-3	Rs 2 13 6	Rs 78 15 6	As 9	Rs. 34 15 6
(9) Miscellaneous expenses	Rs 93 13	Rs 174 11 6	Rs. 10 12	Rs. 396-6 6	As 7 6	Rs. 18 9
(10) Depreciation of appliances	Rs 12 9 3	Rs 12 1 6	Rs 1 12 10	Rs 254 5	As. 9	Not available
(11) Cost of supervision	Not incurred			Not incurred	Not incurred	
(12) Total cost of reeling	Rs 3 738 15-3	Rs 11 148 8 3	Rs 799 14-1	Rs. 14 087 3 6	Rs 74 8	Rs 3 237 8 9
(13) Quantity of raw silk produced	Mds 7-34 or 628 lbs.	Mds 31-37 5 $\frac{1}{2}$ 2 555 lbs.	Mds 3 33 1 $\frac{1}{2}$ 306 lbs.	Mds 32-33 6	Mds 0 7 12 15 $\frac{1}{2}$ lbs.	Mds. 9 28 8 777 lbs.
(14) Quantity of waste	Mds 8 4 4 or 648 lbs.	Mds 19 3 9 1 520 lbs.	Nil	Mds 24 32 10	Mds 0 2 12 5 $\frac{1}{2}$ lbs.	Mds 8 0 6 640 lbs.
(15) Waste represents what per centage of raw silk	103 per cent	79 per cent		75 per cent	34 per cent	82 per cent

	Malda			Murshidabad	Birbhum	
	Tana	Bharna	Ghora		Khamru	Steam basin
(16) Average cost of raw silk per lb excluding price of waste	Rs 5 11	Rs 4 7 4	Rs 2 9 9	Rs 5 5 10	Rs 4 12 6	Rs 4
(17) Rendita according to weight	18 35	14 2	9 5	15	12 8	18 4
(18) Rendita according to kahan	Not known			18 5	8	11 5
(19) Wages of reeler and turner per day—						
(i) Reeler	As 6 6	As 4 6	As 5 6	As 3	As 4 3	As 3 6
(ii) Turner	As 4 9	As 3 6	As 3 6	As 1 6	As 2 3	As 1 6
(20) Output per chakra in 10 hours	91 ch	13 ch	1 sr 11 ch	Not available	7 ch	5 ch
(21) Actual sale price of raw silk per seer	Rs 11 14	Rs 8 15 6	Rs 6 7 6	Rs 10 7	Rs 10 5	Rs 13 10
(22) Actual sale price of waste silk per seer	As 8 4	As 7 6		As 9 8	As 5	As 6
(23) Of the cost of production—						
(a) Raw material represents what per cent	80 per cent	87 per cent	89 6 per cent	82 7 per cent	85 3 per cent	81 3 per cent
(b) Expenses represent what per cent	20 per cent	11 per cent	10 4 per cent	17 3 per cent	14 7 per cent	18 7 per cent

7 The figures only indicate the miserable state into which the industry has fallen at present. Cocoons as well as labour have been paid for at very low rates which are discouraging. In the interest of the industry a fair price for raw silk and necessarily for cocoons as well as for labour is wanted. Taking Rs 25 as price for a maund, i.e., 10 annas per seer of cocoons the following would be the approximate cost of production using *Nistari* and *Chhotopolu* cocoons

	Rs	a	p
Steam basin silk—			
Price of 18 maunds cocoons to produce one maund silk at Rs 25 per maund	450	0	0
Cost of production after deducting price of waste (based on the figure of a filature)	70	0	0
Total works cost on a seer of silk	13	0	0
Total works cost on a lb	6	8	0
Malda tana silk—			
Rendita	16	0	0
Price of 10 maunds cocoons at Rs 25	400	0	0
Cost of production at Rs 1 8 per seer after deducting price of waste based on the figures of a factory at Malda	60	0	0
Total works cost—			
On a seer of silk	11	8	0
On a lb	5	12	0

	Rs	a	p
Malda varna—			
Price of 10 maunds cocoons at Rs 25	400	0	0
Cost of production at Re 1 1 per seer less price of waste based on the figures of a factory at Malda	42	4	0
Total works cost—			
On a seer of silk	11	1	0
On a lb of silk	5	8	6

In Japan the expenses for reeling and other incidental charges in the production of raw silk were about 1929-30 calculated at a standard rate of 300 yen for spring cocoons and 450 yen for autumn cocoons per bale of 133 3 lbs or about Re 1-11 and Rs 2-1 respectively per lb at current rates of exchange (yen 100=Rs 78). At present it is reported to be about 180 yen or Re 1-1 per lb. The rates given above for the three classes of Bengal raw silk do not include cost of supervision and other incidental charges but still compare fairly with Japan.

8 *Economics of silk weaving*—The major portion of the weaving is done on handlooms and various types of cloth are woven. The figures given below of actual census taken refer only to common *sari*, *dhoti*, *chadar* and *thani*. The figures therefore are not comprehensive but give a general idea of the present economics of common types of weaving. They also indicate the poor state into which this part of the industry has fallen. The weavers' daily earnings are hardly more than those of ordinary labourers.

TABLE XIII

Abstract census taken for weaving

	Malda		Burbhum.		Murshidabad	
	Silk	Matka	Korathan.	Korathan pag- ree	Dhoti and Sari	Broad cloth
1 Period of observation	November 1937 to August 1937		May 1937 to March 1938		1937-38	
2 Number of weavers under observation.	2	1	1	1	2	2
3 Kind piece woven	Sari	Than	Kora than	Kora pagri	Dhoti and sari	Broad cloth.
4 Length and width woven	5 yds \times 44" each (72 pieces)	12 yds \times 45" each (6 pieces)	10 yds \times 44" (24 pieces)	64 yds \times 35" (10 pieces)	205 yds \times 45"	152 yds \times 40"
5 Denier of raw silk used	22-24	Not available			Not available	
6 Quantity used for warp	11 srs 4 ch	7 srs 8 ch	6 srs 1 ch	10 srs	5 srs 2 ch	3 srs 12 ch.
7 Quantity used for weft	11 srs 2 ch	5 srs. 8 ch.	8 srs 1 ch.	15 srs	10 seers.	6 srs 4 ch.
8 Price of 6 and 7	Rs 231 5 6	Rs 99	Rs 155-3 6	Rs 231-4	Rs 199 6 6	Rs 121-15 6
9 Preparatory cost—						
(i) Family	Rs 18-11 9	Rs 4-13 6	Rs 14-4	Rs 1-11-6	Rs. 24-10	Rs 14 6
(ii) Hired	Rs 32 7-9	Rs. 2-9 9	Rs 3 5	Rs 7-8	Rs 12 12	Rs 7-3
10 Weaving cost—						
(i) Family	Rs 73-5 9	Rs 20-4	Rs 30 9 9	Rs. 51 3 6	Rs 63 10	Rs 43 8
(ii) Hired	Nil	Nil	Nil	Nil	Nil	Nil.
11 Depreciation of appliances	Rs 6-4	Rs 3 2	Rs 2	Rs 2	Rs 5	Rs 2-8
12. Total cost of weaving	Rs 362 2 9	Rs 129 13-3	Rs 205 6-3	Rs 313 11	Rs 305 6 6	Rs 189 8 6
13 Average cost of production per yard.	As 15 11	Rs 1-12 10	As 13 8	As 7 10	Re 1 7 10	Re 1-3 11
14 Average daily output per loom	1 yard	1 yard	2½ yards	2½ yards	1 yd 1 ft 1 in	1 yd 1 ft 9 in
15 Average annual output per loom	243 yards	173 yards	262 yards	740 yards	102½ yards	76 yards
16 Average price obtained per yard	Rs 1 2 9	Rs 2 2-6	As 13 8	As 7 10	Re 1 6 1½	Re 1-4 5
17 Percentage of raw material	64	76	75	80	66	65
18 Percentage of labour cost for weaving	22	19	16	16	22	23
19 Percentage of preparation cost	15	5	9	4	12	12

9 *Eri silk* —Eri worms feed on castor leaves. Eri rearing is carried on in Bogra district and in part of the adjoining Rajshahi district. A census was carried out in Bogra district this year. Castor is grown on home-
stead or waste lands each rearer having usually a few to about 30 plants at the most. In places which are not submerged in the rainy season four crops of leaves are obtained and four rearings carried out. In other places two or three rearings are done. Rearings are necessarily on a small scale and are carried out by women varying in age from about 30 to 70 years. The rearers also do the spinning themselves with hand spindles and usually sell the thread to Marwari dealers who export it to Assam where apparently weaving is carried out. Only a small portion of the thread is woven in Bogra district. Rearing decreased on account of very low prices

which prevailed for sometime. At present there are 360 rearers and spinners scattered in 90 villages and the annual production of thread is about 24 maunds (maund=40 seers of 60 tolas each) of the value of about Rs 2 800.

CHAPTER VI

Improvement of cocoons—The indigenous *Nistari* and *Chhotopoli* races of worms are admittedly poor. *Barapoli* is better but not to the extent desirable. Besides *Barapoli* being one-brooded is reared only once in the year. The rearers want many brooded races. With this end in view under the present circumstances improvement is possible in two ways—

(1) To have a fixed hybrid race or races produced by hybridisation of *Nistari* and

Chhotopolu with a superior one-brooded race. It takes several years to fix hybrids and eliminate their defects.

(2) To have first crosses between *Vistari* and *Chhotopolu* with suitable superior one-brooded races. This requires suitable one-brooded races acclimatised here. The first cross eggs have to be produced under supervision and given to the rearers for every crop. The rearers cannot keep eggs from first cross moths for rearing.

2 *Introduced improved races*—Six improved races produced according to the first method in Burma with the local Burmese races were introduced in 1906 and at first tried in Berhampore Nursery. Out of them three races were obtained and considered suitable viz *Vistid* white *Vistid* yellow and *Nismo* (yellow). Their behaviour in nurseries in the hands of selected rearers in the hands of general rearers and qualities are indicated below and compared with those of the indigenous races. It should be remembered here that as explained elsewhere they have not been kept disease-free. It will be noted that they are much better than the indigenous races. Continued research is necessary to produce similar fixed hybrids with indigenous *Vistari* and *Chhotopolu*, to maintain such hybrids in a selected improved condition and to improve them further. That they are capable of such improvement will be evident from the fact that *Nismo* is nearly as good as French Italian and Japanese one-brooded races. Research has just been undertaken for these purposes and also towards production of suitable first crosses.

3 Behaviours as to the degree of success in actual rearing is indicated by the number of layings required for a kahan (1280) cocoons and the number of kahans or seers obtained from a kahan or seer of seed cocoons or 100 layings used. The quality of cocoons produced is indicated by the number of cocoons in a lb or the weight in lb of cocoons obtained from 100 layings, total silk content of cocoon, length, weight and denier of the filament obtained from the cocoon and actual result of reeling.

4 In the following statement the results of large and fairly large rearings are included. Results of trials with 5, 10, 15 or 20 layings are omitted. *Vistid* and *Nismo* show still better results in such trials. With the existing food supply they do not fare well in the very rainy months and the results of trials in wet months are omitted. It may be noted that ordinarily with the existing races of worms yield of 60 seers or kahans in two gharas with one kahan or seer of seed or about 500 layings, i.e., about one seer or kahan per about 8 layings and about 24 lbs per 100 layings are considered satisfactory by general rearers.

5 *Nistid* worms have been issued to general rearers and are popular with the rearers in Murshidabad, Birbhum and Bankura districts. Their cocoons sell at about one and a half to double the price of those of *Vistari* and *Chhotopolu*. *Nismo* worms seem to be sufficiently acclimatised and may be issued to rearers in November next.

Conclusion and possibilities of improvement

15. (i) The results of trials as detailed in the section on improvement of cocoons will show that improved cocoons are now available

It is only necessary to work them up and push them. Reeling concerns are able to do this. Absence of reeling concerns is now being keenly felt. Steps require to be taken to develop reeling concerns on a proper scale.

(ii) A close study of the conditions for two seasons has revealed the following facts:

(a) Adverse climatic conditions affecting mulberry cause more loss than diseases. The only means of remedying this is to have tree mulberry in regular plantations which should be subsidised as is being done in Mysore and Kashmir. Trees are much less liable to adverse climatic conditions and yield leaves even in periods of drought when bushes suffer badly. A successful technique has been worked out for growing trees and it is now a question of putting this into practice. Actually about 35 maunds of leaves have been obtained from a bigha of trees. This yield is capable of increase and if it can be increased to 50 maunds the cost will be reduced to about half that of bush. Trees will also enable high yielding cocoons being raised with less difficulty than with bush.

Tree mulberry and high yielding races of worms now available will give the industry a fillip.

(b) About 70 to 90 per cent of the rearers use unexamined village seed. This requires to be remedied.

(c) There is a dearth of trained hands.

An institute for training the staff is an urgent necessity. This is best combined with research. The Research Officers can look after training in a proper manner.

(3) Research must be continued for—

(a) Improvement of cocoons and successful results are expected on the lines on which the introduced improved races *Nistid* and *Nismo* had been evolved by the writer in Burma. Production of first crosses should also be attempted.

(b) Improvement of mulberry.

(c) Study and elimination of diseases both of worms and mulberry.

(d) Improvement of reeling.

Work on (a) (b) has already been undertaken and that on (c) will be undertaken early next year with the help of the Government of India's grant. The Peddie Silk Reeling Institute and the Conditioning House will carry out (d).

Acknowledgments.

16. The staff has worked loyally and the following among them deserve special mention, viz., Rai Sahib S. N. Bose, Babus S. K. Moulic, A. C. Dutta, G. N. Roy and Mr. J. C. Bain.

I am also thankful to Mr. B. R. Sen and Major I. Stewart, Collector of Malda, for their interest and help in the cause of the industry.

On account of new schemes and various expansions clerical work in the office has increased to a very great extent and the office staff whose strength has not been increased had to carry it out and they did it ungrudgingly.

C. C. GHOSH,

Deputy Director of Sericulture, Bengal

The 7th July 1938

APPENDIX I

Statement showing the expenditure under different budget heads for the year 1937-38 (General)

Budget heads	Expenditure
	Rs a p
Pay of officers	25,138 11 0
Pay of permanent establishment	45,028 5 0
Pay of temporary establishment	488 12 0
Travelling allowance	10,299 5 0
House rents and other allowances	12 8 0
Contribution and grants	490 0 0
Rewards	1,500 0 0
Stipends	663 13 6
Purchase of seeds and implements	17,871 4 0
Rates, rents and taxes	3,087 6 1
Petty construction and repairs	7,288 9 6
Books and periodicals	99 2 9
Other charges	49,260 4 3
13—Industries D—Works	12,351 1 9
Total	1,73,579 2 10

APPENDIX II

Statement showing the expenditure under different budget heads under India Government grant for the year 1937-38

Budget heads	For seed production	For Research work
	Rs a p	Rs a p
Pay of temporary establishment	17,715 10 0	2 093 6 0
Travelling allowances	2,899 11 0	458 0 0
Rewards	10,000 0 0	
Purchase of disinfectants	1 498 13 3	
Purchase of seeds and implements	1,551 0 0	
Rates, rents and taxes	1,757 5 6	
Contingencies—Other charges	2,078 12 0	2,099 14 10
	37,501 3 9	4,651 4 10

APPENDIX III

Total sale proceeds for the year 1937-38 (General)

(1) Sale proceeds deposited into the treasury during the year 1937-38	13,867 9 6
Inter departmental supply	2,164 9 3
Total	16,032 2 9

India Government Scheme

(2) Sale proceeds deposited into the treasury in connection with India Government Scheme during the year 1937-38	444 4 3
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